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Editorial

MISSING INGREDIENT

Stanley Schmidt

I'm writing this shortly after "Earth Day 1990," marking the twentieth anniversary of the original Earth Day with the most widespread show of environmental concern since 1970. Like many others, I'd like to believe that such a massive demonstration marks a real beginning of massive, worldwide environmental consciousness that is genuine, sincere, and well reasoned. Unfortunately, there's a part of me that can't help wondering whether it's really just the second episode of ecological faddishness in my memory.

There are several little reasons for my skepticism—and one big one. The little ones include a variety of indications that people *mean* well, but haven't thought through the issues. One I commented on a few issues back: big arguments over the relative merits of paper and plastic grocery bags, with little mention of the third alternative that has a huge

advantage over either. (I wrote "Bag Limit" because at that time *nobody* else seemed to be mentioning the obvious. Shortly after I wrote it, and before it was published, I saw several other discussions making the same point. At times like that, I wish *Analog* had a shorter lead time, though I was still glad to see others saying what needed to be said.) Along similar lines, I've heard many discussions touting one alternative (such as cloth diapers) as The Only Way To Go, with little or no consideration of the hidden costs of the *other* alternative that make the real choice far less clear than it seems at a casual glance. I've also noticed inconsistencies, such as urging people to turn their home thermostats Way Down while ignoring the fact that most huge *public* buildings are chronically overheated in winter and overcooled in summer.

But the real oddity—the big difference from the first Earth Day, and the

big reason for fearing that many people are simply following a fad rather than genuinely trying to understand and solve a big problem—is the conspicuous absence of the most important single factor from the flood of Earth Day hype. It hit me when I was looking at yet another “How Environmentally Aware Are You?” quiz in a Sunday supplement. It was full of questions like, “How many of the following materials do you recycle? (One bonus point if you separate colors of glass.)” *But nowhere on it was a question even remotely resembling, “How big a family do you have, or plan to have?”*

That struck me as odd; and on reflection I realized that in all the miles of column space and hours of air time I’d seen devoted to Environmental Awareness recently, *population* had seldom even been mentioned. Yet the large size and high growth rate of the human population are the most important single factor in the whole complex of environmental problems we must deal with. If there weren’t so many of us, and we weren’t multiplying so fast, most of the other problems would be far less acute. If nothing is done to control the rate of population growth, all the other measures, noble as they may be, will be little more than fingers in the dike. Those may be very effective in fables about little Dutch boys, but they don’t do so well against the pressure of a real ocean.

Discussions of this issue were a very prominent part of the first Earth Day. ZPG (Zero Population Growth) was one of the more vocal organizations then, and even people who considered the

ZPG position extreme commonly recognized that population was a key issue in the whole business of ecology. In 1990, almost the only mention we hear of population is the emotional chorus of people trying to eliminate legal abortion (and, of course, the counter-chorus of those trying to preserve it).

There’s a huge and frightening irony in the fact that the biggest wave of anti-abortion activism in recent history coincides with the biggest wave of avowed pro-environmentalism. Hardly anyone, on *either* side of the abortion controversy, seems to be giving the slightest thought to what the *consequences* might be if the absolute right-to-lifers have their way, or the fact that those consequences are very, very environmental.

Even in this country, where a wide range of contraceptives is readily available, the abortion rate is so high that eliminating it (without changing anything else) would sharply raise the rate of population growth (which has already taken a distinct upturn). In other parts of the world, this is even truer, by a large margin. Population growth is *already* at a dangerously high rate. Eliminate abortions, and the real-world prognosis is that it will get far worse, immediately. That means more crowding, more famines, more shortages of fuel and housing, and more health problems of every sort.

Yes, I know it *shouldn’t* be that way. Of course, there are plenty of ways to prevent conception in the first place, and if they are always used and always work perfectly, unwanted pregnancies should never occur. But in the real world, they

aren't always used, and they (like any other technology) do *not* always work. The real world, like it or not, is the one we live in. And in that real world, sometimes whether the job is actually *done* is more important than whether people are trying to do it in the best possible way. If a technology fails, or you can't get people to use it, you need fall-back methods to correct the error. I don't *like* abortion, but sometimes the alternatives are worse. In much of the real world,

as it now exists, abortion is what people rely on to control population when better methods fail, whether for human or technological reasons. If people want to do away with it *and* be taken seriously when they say they care about the environment, they are going to have to come up with *realistic* alternatives to fill that fall-back need. Like them, I would *rather* see population controlled entirely by other means. But it *must* be controlled, one way or another.

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Analog Science Fiction/Science Fact (Astounding) is published every 88 days with special issues in January and July by Davis Publications, Inc. at \$2.50 a copy in U.S.A., \$2.95 in Canada, 1 year subscription for \$34.95 in the U.S.A. and possessions, in all other countries, \$39.65 payable in advance in U.S. funds. First copy of new subscription will be mailed within eight weeks of receipt of order. When reporting change of address allow 6 to 8 weeks and give new address as well as the old address as it appears on the last label. Second-class postage paid at New York, NY, and at additional mailing office. Canadian 3rd class postage paid at Windsor, Ontario. © 1990 by Davis Publications, Inc., all rights reserved. Protection secured under the Universal Copyright Convention. Reproduction or use of editorial or pictorial content in any manner without express permission is prohibited. All stories in this magazine are fiction. No actual persons are designated by name or character. Any similarity is coincidental. Printed in U.S.A. All submissions must be accompanied by stamped self-addressed envelope, the publisher assumes no responsibility for unsolicited manuscripts or artwork.

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 IN CANADA RETURN TO 1801 SOUTH CAMERON, WINDSOR, ONT. CANADA N9B 3E1
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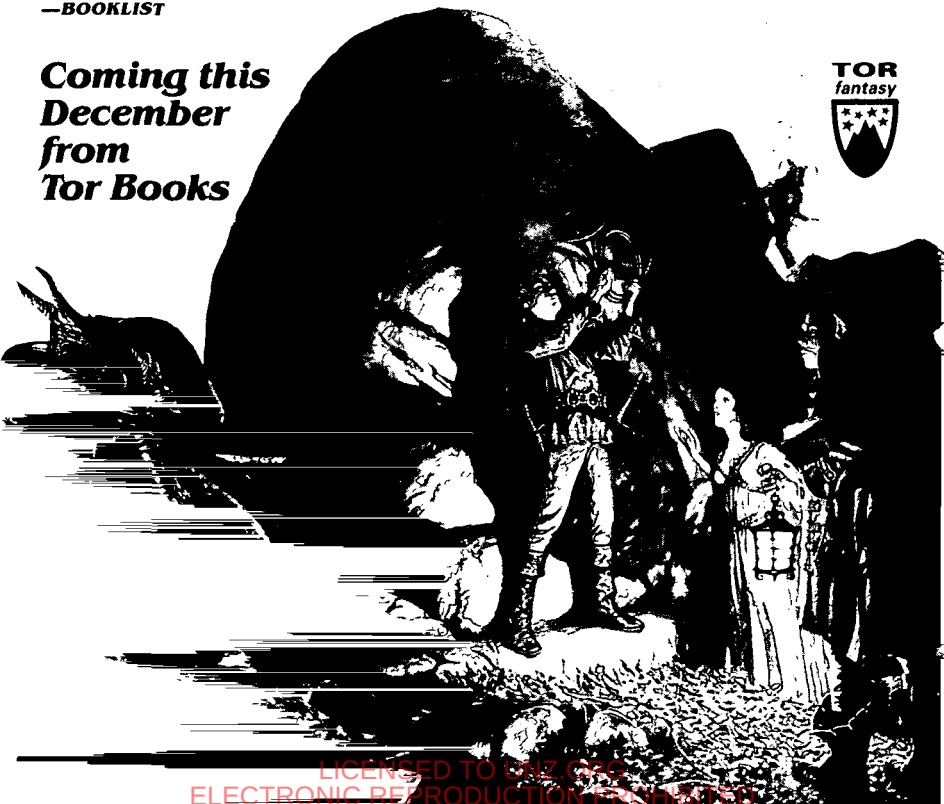
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(Please don't mention adoption, by the way. It is a helpful approach to the *individual* problems of unwanted children, and parents who want children and can't have their own, but it does absolutely nothing for the *population* problem. Therefore it's completely irrelevant to this discussion.)

How much does the population need to be controlled—that is, how many people can the Earth, or a given part of it, support? No doubt it can support a good many more than it already does—but not very comfortably. Not only does dividing the material pie among more mouths result in smaller slices, but crowding is well known to produce stress and psychological disorders. I realize that there are those who really believe that what the world needs is as many people as possible; but no matter how sincere the belief, the concept is ecological nonsense. The “prolifer” who points out that humans are part of the ecosystem and need to protect their own species as well as others is quite correct—up to that point. But in the long run, reproducing without limit is anything but protective of *any* species. Carried far enough, it becomes literally self-destructive. Considerably before that point, more and more individuals will find themselves less and less happy with their crowded conditions. Fifteen billion crowded, undernourished, disease-ridden, poor people are *not* clearly better than a few billion healthy and happy ones sharing a world with some abundance and diversity left in it.

Many of us would much rather see

better lives for fewer people than wretched ones for vast numbers. Individual and cultural preferences vary, of course, in such matters as what is a desirable compromise between standard of living and population density (though there seems to be a fairly clear pattern of population growth slowing when standard of living goes up). This fact may require some rethinking of ethical precepts. I don't offer an answer, but I will pose a question for consideration.

There are those who point to the existence of some countries with relatively small population densities and high standards of living and others with dense populations and low standards of living, and try to make the former feel guilty about being well off. To the extent that their prosperity is based on their exploitation of others less fortunate, rather than their own efforts and ingenuity, a certain amount of guilt really is in order. Certainly some of the highly developed countries (notably this one), use energy and other resources less efficiently than they should, and they should improve their performance in that respect. But should they really be expected to willingly relinquish, or feel guilty about, a better way of life that they *have* built largely through their own efforts—even if it does consume more per capita than someone else's ways? What is “fair” allotment of resources?

A popular (and simple-minded) answer is “equal”: everybody gets an equal share. Some case can be made for this, given a fixed number of people (though even then its lack of any incentive for individual effort is probably not

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good for the long-term health of the culture). But the fact that the number of people is *not* fixed is crucial to these questions, and has been largely ignored in most discussions of them.

Consider a hypothetical case: two countries, *A* and *B*, of equal size and initially with equal populations and equal supplies of renewable resources. Those peoples have a choice: they can keep their populations as they are, or let them increase or decrease. Suppose *A* chooses to keep its population, and therefore its per capita wealth, stable, while *B* chooses to multiply to ten times its initial population, thereby reducing by a factor of ten the amount of elbow room, food, and everything else available to each of its citizens. Do the citizens of *A* really owe any help, guilt, sympathy, or apologies to those of *B*?

Remember, each had the same choices available. . . .

Admittedly, a disturbing question, and not a simple one—but one that I

think requires serious consideration. Yes, I know that the hypothetical case is simpler than any actual situation—but principles derived from considering it are clearly pertinent to the real world. The first such principle, I suggest, is that *sharing among people who already exist is not at all the same thing as sharing with people who haven't yet been created and don't have to be*. Another is that *both* per capita consumption and the number of “capitas” are variables over which people have control, and for which they must take responsibility.

In any case, whether you're looking at individual nations or an entire planet, one thing is a simple matter of ecological fact. *Whatever* resources are available, you *cannot* keep dividing them among more and more organisms and maintain a viable system. Therefore a simple-minded “Let's reproduce as fast as we can” is utterly inconsistent with any claim of environmental responsibility. ■

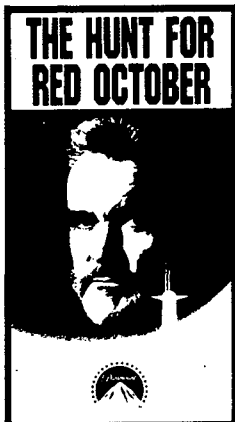
●The last function of reason is to recognize that there is an infinity of things which surpass it.

Blaise Pascal

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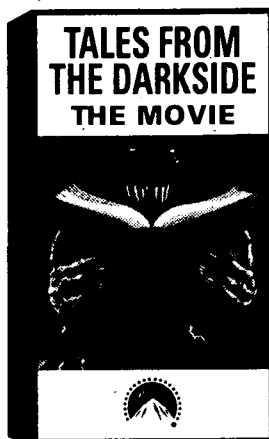


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before it is fully understood—
but that requires a full measure
of care and responsibility.

GLORYSTAR

Alexis Glynn Latner

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1
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My people have not lived on a planet for a thousand years. For starvoyagers such as we, the galaxy is a sea of suns, with spindrift of dust and nebulas. And *constellation* means something quite different from the patterns of fixed stars in a world's night sky.

I was the astrogator's apprentice. I knew that starships traveled in a series of instantaneous jumps. The galaxy contained a finite number of points, between which such starflight could go, and the points of starflight constituted sets. We called the sets constellations. An astrogator could live and learn the constellations for a lifetime without mastering them: they were that complex and crucial. In my short career I had learned only a little about the constellations, and it was recent learning, not engraved very deeply in my brain and reflexes. The idea that our constellations might not be real at all—might be a veil thrown over the stark truth of starflight—did not disturb me. It only stirred my curiosity.

The ship's technician had just come up to the bridge. He opened a console and put his head and hands inside it, intent on making some minuscule repair.

"Kluge? Have you ever heard of uncertain constellations?" I asked him.

"No," he grunted. "Why?"

"Plerion was just saying—"

"Plerion has strange and downright dangerous ideas. And you, lass, are supposed to be keeping your mind on your duty!"

This was the first night of our mission. I had flown with the starship *Dragonfly* twice before. This time, finally,

I had the training to qualify as crew, albeit the youngest and least experienced of the crew. As such, I got the first night's watch. I should have been utterly attentive to the constellations in the astrogator's window. Instead my attention flicked away toward the other, the mysterious uncertain ones, gone from the window now, but distractingly apparent in my imagination.

Fortunately our safety did not depend entirely on me. *Dragonfly* did its own watching. The Icons of its watchfulness flashed on the astrogator's window: course, energy levels, and the presence of a deadly danger, behind us now—a black hole. *Dragonfly* flew itself, aiming for our mission's destination. Starflight registered on the constellations as a kind of chromatic ripple. A faint scrape came out of the console. Kluge had wormed in so far that only his sandals showed. He always liked to make his inspection and repair rounds in the middle of the night. I tried to do my job better, watching the astrogator's window intently.

Something flashed in the window. A new Icon, a red triangle. Unbelieving, I recognized the Dire Icon. Then another one appeared. I yelped.

Dragonfly did not wait for me to hit the red alert button. Its alarm rang through the night-lighted bridge and the corridors below it. Kluge came out of the console like a snake. The alarm sounded and resounded, a harsh triple tone, ENEMY, ENEMY, ENEMY!

Captain Sinter and our astrogator Zeph came running in, with Plerion the tactician right behind them. I sprang from the astrogator's chair just before

Zeph would have thrown me out of it. More Dire Icons appeared on the window. There were five—now ten. White-hot shock shot through the group of people on the bridge. “We’ve stumbled into a nest of them,” Sinter said, grating out the words.

Evaluating the constellations in the astrogator’s window with one experienced glance, Sinter named a point. Zeph immediately changed our course, making *Dragonfly* jump to that point. Sinter’s pick flared bright blue. It faded to red as his next point flared. The constellations in the window rippled, very slightly, as Sinter extricated us from the enemy’s midst in small moves that would be almost undetectable to the enemy. The Dire Icons did not seem to react.

Fine detail was written on the Dire Icons. Sinter peered close. “Warships, no less,” he said, and ordered another slight jump.

“Holy mother Terra, save us!” gasped Kluge.

Dragonfly was not supposed to tangle with the Enemy. Not under any circumstances. It was a starexplorer, a long, thin, fast, frail starship, with a very big computer brain, all kinds of instruments, and no weaponry. It could outmaneuver any one of the warships—but not all of them. Not if they noticed us and not if they decided it was worth their while to catch us.

We felt a tremor, more vibration than sound, transmitted through the structure of the ship. The voice of our engineer seemed to come out of the air over the bridge. “Five’s unlocked now.”

Sinter said, “Thank you.”

Another jump. Sinter spaced jumping

and waiting, at irregular intervals. He wanted us to look like a random fluctuation in the constellations. Wait. Jump. Waiting pulled our nerves taut and jumping snapped them. Still the Dire Icons did not react. Somebody let out a sigh, long, shaky, and premature.

Sinter stood behind Zeph in crumpled clothes that had been flung on hastily. In a level, intense voice, Sinter said, “How in the name of Malison did this happen?”

And I knew. In a fractured second, I recalled the chain of events that led to this outcome. The recollection dismayed me.

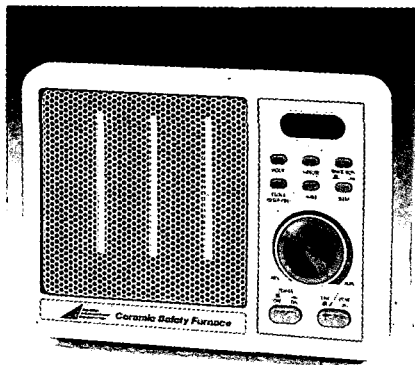
We had departed from our mother ship, *Parhelion*, late in the day. This was not meant to be a typical mission for *Dragonfly*. There were no scientists manning the instrument stations—no visitors wandering in the corridors—no new people settling into the living quarters. With only a skeleton crew, *Dragonfly* seemed vast and empty. After dinner the starexplorer dimmed its lights and its emptiness filled up with night.

I reported to the bridge to take my watch. The bridge was a solid structure, long, but not very wide, curved, and studded with consoles. All around this bridge—the starbridge—lay a huge sphere of visual screens: the panoply. Stars in every direction, starry space broken only slightly by the dark traceries of ship that held the screens in place. Overawed, I stopped short.

Zeph was waiting for me. A man alone on that slender bridge across the stars, the astrogator gestured to me. Come. The astrogator’s window was a high circle of amber, crossed by a mesh

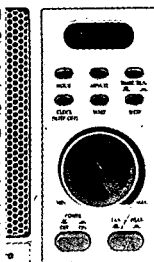
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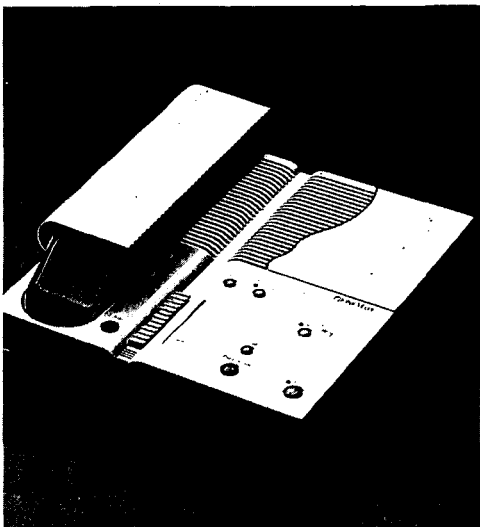


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of coordinate lines, with hundreds of bright constellation points and scores of icons. Zeph stood up and I took his place in front of that window for the first time in my life. Zeph gave me a long, steady, serious look. Then he left the bridge.

Zeph was not much of a talker. Now I understood why. Being here at night, surrounded by the panoply and faced with the golden window, could squeeze the banal chatter out of a person. Tense, biting my lip, I pored over the window, trying to apply months of study to the dense field of symbols. I struggled to comprehend the changes that flashed across the window with every starflying jump that *Dragonfly* made.

Near midnight an icon on the window told me that *Dragonfly* had detected a black hole near our course. I made sure to log it. Then I turned around to look for it on the panoply. A spiral of bright light marked the black hole. The spiral's black heart was the star that had collapsed into a singularity and was destroying its binary companion star, sucking in the incandescent matter. The idea made me shiver.

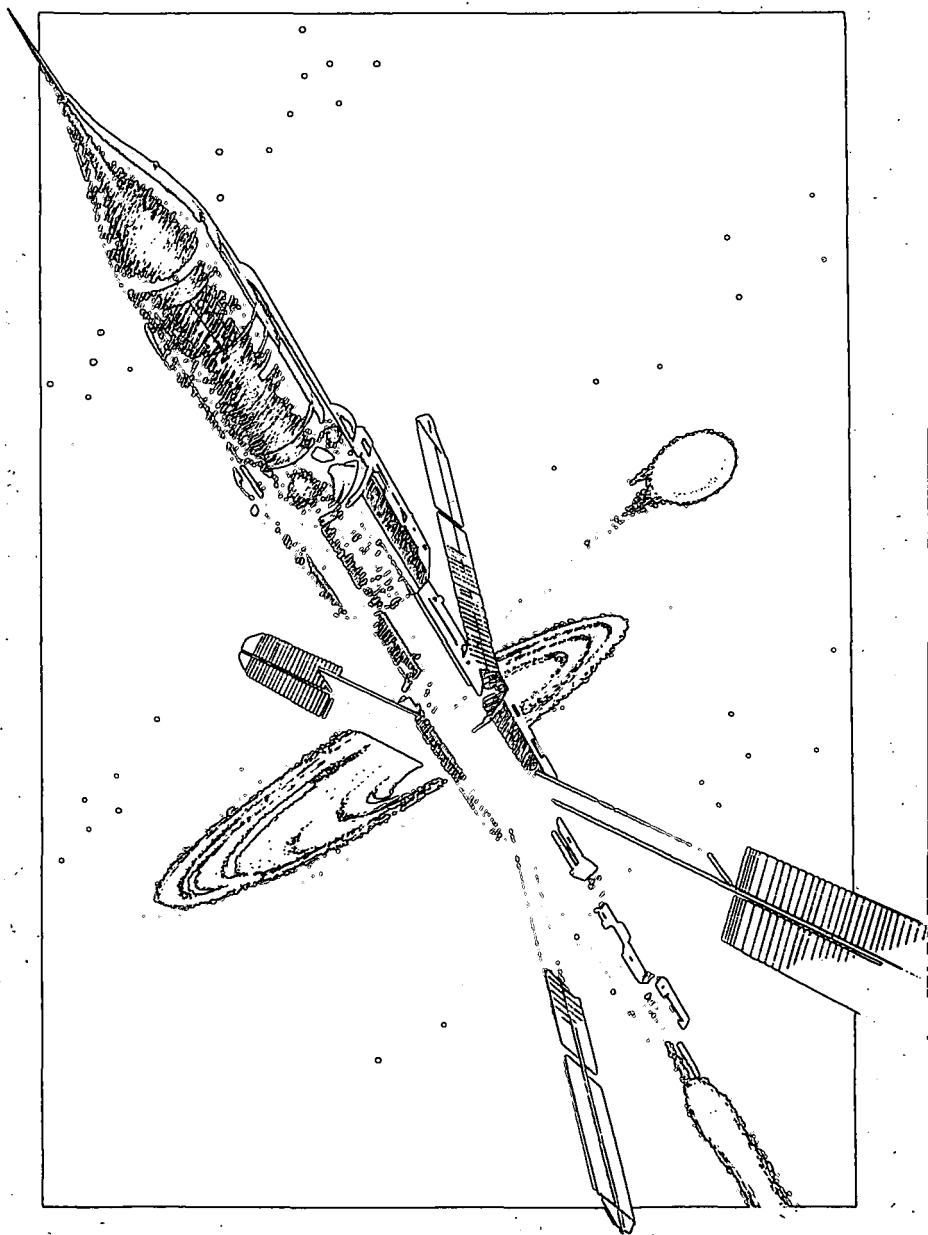
In the very center of the panoptic sphere hovered a hologram, a model of *Dragonfly*. The holographic *Dragonfly* pointed away from the black hole. Course changes rippled across the constellations as the starexplorer gave the black hole a wide berth and then returned to its course. *Dragonfly* would have avoided the black hole even if I had never logged it. From a safe distance, *Dragonfly* analyzed the black hole system. Information scrolled across the astrogator's window.

My mind strayed still further away from the constellations. I started think-

ing about another peril lurking in the stars, a danger more insidious and evil than black holes. The Enemy. The language of my people had a word for the Enemy, a word out of ancient history. The word meant Nameless. It also could have been translated Shapeless or Uncreated.

I was no historian. I uncritically shared the legends of my people concerning the Nameless Ones. More than a millenium ago—so went the popular version of our history—the human race had achieved a high level of civilization, a web of culture spun across a score of colony worlds. Then out of unknown and unexplored space came the attack from an alien race—fleets of warships, covering whole worlds with flames of war and destruction—nothing less than an evil empire bent on the conquest of humanity. With great valor, humanity fought back.

My ancestors were fighters. In the end they won the war, but lost their homes. The sweeping battles of war had ruined whole worlds, leaving ecologies ruptured, cities leveled. The interstellar web of civilization was hopelessly broken. Having starships, but no homes to return to, my ancestors wandered from star to star. Finally they left the known colonies altogether in travels that took them across a thousand years of time and thrice as many light-years, winding their way through the galaxy in the general direction of long-lost Earth. They sought the resources and the knowledge that would be needed to start civilization all over again. They never found Earth. Instead, learning how to live as star travelers, they fell in love with the wilderness of stars. It was ironic that the



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ancient Enemy caused my people to be. We gave the Nameless Ones that much credit, at least at the level of popular legends and proverbs. Then, a few years before I was born, my people stumbled onto the core of the Nameless One's old empire—shrunk as a white dwarf star, and still malignant.

Now my people had ships patrolling, mapping the Enemy's extent, its fleets and nests. And *Dragonfly* was en route to a place far away from any of the Enemy, there to practice tactics that might one day be used to our advantage in war.

Shivering, I tried to refocus my whole attention on the constellations. But my imagination kept running anywhere and everywhere; to old legends of war and Earth, to planets, strange life forms, discoveries that my people had made over the millenium, and mysteries still undiscovered, waiting for us in the stars. I imagined that the starlight from the panoply, washing over the bridge, was palpable, cool and clean.

I did not hear Plerion coming. Quick and graceful, she appeared suddenly, as if she had materialized out of the starlight.

Quickly I stood up to make a small formal bow. "Hello, Tactician!"

"Greetings." Standing face to face with me, she sized me up. "How old are you, Cob?"

"Fifteen, Tactician."

"You're big for your age! You'll be a taller woman than I am." Even in the night, my height and the bone structure of my face gave me away. Plerion asked, "Can it be—are you a Guardian?"

Reluctantly I nodded.

"Then what are you doing here?"

"I want to be a ranger," I admitted. "Sinter is my best friend's uncle. So he agreed to take me into *Dragonfly*."

Plerion laughed. "A Guardian who follows desire, not duty? How refreshing!" She sat down in the astrogator's chair as if she meant to stay for a while.

I pounced on this unexpected chance to ask questions—one of my specialties in life. "Tactician, what are we going to do tomorrow?"

"Practice tactics," she said.

"How, Tactician?"

"You really want to know?"

"Yes!"

"Very well." She relaxed. My family would have called her pose a slouch. She slouched like cats do—as if they have no muscles in their bodies, as if their skins are full of feathery nerves. "Are those the stars?" She gestured at the panoply.

"No, Tactician," I said promptly. "The eye can't see the universe in star-drive. So *Dragonfly* paints the picture for us. The computer generates the image, how it ought to look. And the computer fixes the image all the time." Between jumps, the starexplorer paused in real space, and its computer reconciled the visible cosmos with what it imaged on the panoply. It did this even as we talked, I knew, but the procedure was too subtle to see.

"So. You're ahead of most people in understanding. You know that the real stars aren't what we see on the panoply. It's an illusion—a very pretty one. What about the constellations, in the window?"

"Oh, yes!"

"Yes, what?"

"They're there. We jump from point to point. There are universal sets of points subject to local transformation—"

"I know, I know. Let me rephrase that. Are the constellations true?"

I felt confused. "Yes?"

"Are they the whole truth?"

Here I was on firmer ground. "There are more," I said, "if we operate at a higher energy level."

She shrugged. "High-energy constellations. Like the faint stars that the ancients saw with telescopes, invisible to the naked eye. New stars in the same old constellations. Constellations! Useless old word. Language is so inexact—not like mathematics!"

"What else is there, Tactician?"

"Do you really want to know?"

"Yes!"

"Sinter might not like it," she said, "if I corrupt the education of his little Guardian."

That nettled me. My people called my particular family the Guardians, that being a not-always-affectionate nickname for us. My family had always guarded the traditions of my people, with a passion and a vengeance. We were officials, admirals, judges, pillars of society such as that. But I wanted to be a star ranger. I said, "He doesn't have to know that I know."

"Good idea." She reached over to touch the astrogator's controls. The golden window went glittery. It filled with faint flickering points of light. "Constellations," Plerion said precisely, "are just the points that are probably there, rather than the ones that probably aren't there over an interval of time. There are an *infinite* number of constellations. If you count these, the

temporary ones—the uncertain constellations."

The window swam with them, and they flickered in and out of being. "Oh," I said. "Then can we go by them just like the regular constellations?"

Plerion laughed. A clear ringing laugh, it reached the rafters of the panoptic sphere and echoed back like the amusement of the stars. "What an unorthodox, unthinkable idea. And—true!"

The window glittered. Even the old constellations—now just the brightest and steadiest of all the points in the window—flickered at the limits of discernability.

"Plerion, why are the constellations, the certain ones, flickering like that now?"

"They are a function of the uncertain ones. A concatenation of probabilities. They last for a long time. *But not forever*. They can cease to exist—even just when a starship constellates."

"What happens to the ship then?"

"Oh, it ceases to exist. At least in this universe. Look closely. There is a single point on the window that's absolutely steady. It, and only it, is certain to the end of space and time."

She meant the black point in a ring of flashing red. The black hole.

With a strange curl of a half-smile, Plerion asked softly, "Knowing what you do now about the old constellations, do you still feel comfortable at the thought of using them?"

"Sure," I declared.

"Then do so for me."

"Tactician?"

"Oh, for Malison's sake, I'm not that old. Call me Plerion. See that? It rep-

resents a multiple star system. White dwarf, red giant, blue giant."

"There might be planets!" I imagined worlds in orbits lacing among the three stars; strange light and shadows falling on the icescape of a moon.

"*Dragonfly* should explore that system."

"Plerion—you want me to change *Dragonfly*'s course?"

"You're the astrogator, tonight. According to the rangers' rules, I'm not allowed to direct the ship, but you are."

She was right. I, the astrogator's apprentice, considered crew tonight, on watch, could do that. The realization thrilled me.

"Do you not know how yet?"

I knew how. And I thought that the tactician, with the blood of my people in her veins and a starship like *Dragonfly* at her disposal, wanted to see the multiple suns. Sinter often told Zeph to redirect the starexplorer, in order to visit stars and their planets. Plerion specified the new coordinates, sharply divergent from our previous course. And I redirected *Dragonfly*. Smiling, Plerion reached toward me. I thought she meant to ruffle my hair. But no such condescending gesture as that—she touched my lips. Then she touched the astrogator's window to make it return to normal. "I'll be back shortly."

Just as Plerion left, Kluge came in to repair the console. He made a courtesy bow—the kind he always gave to military people, a bit jerky as though his backbone needed oiling, telegraphing his unspoken reservations about militarists.

I was happy. I had directed the starship.

I had directed *Dragonfly* right into a nest of the Nameless Ones.

The Dire Icons shifted.

"That's it, they've spotted us," said Sinter. He gestured toward Plerion. She stepped forward immediately. This had turned into a military crisis. *Dragonfly* was hers to command now. Plerion spoke for the engineer to hear. "I need energy clear to max!"

In answer, *Dragonfly* vibrated; the vibration trailed away, but left a subliminal hum. The hum meant that the engines could operate at the highest possible energy level—at the price of minimized control. The engines were slightly unstable now.

Plerion called for something that only a starexplorer like *Dragonfly* could have done. *Dragonfly* stretched energy fields like wings into stardrive space. Twisting its wings of field, the ship darted into a new constellation, one at the constellation-space equivalent of right angles to the first. That would be a hard move for a warship to follow.

Kluge sent out a distress call to *Parhelion*.

"Reconstellate." Plerion evaluated the constellations, the possibilities accessible from this new position, points of light cascading across the astrogator's window. She decided quickly, and called for a series of zagging jumps through the constellations.

"She's good at this," Zeph said to me.

I turned my head to look at the pany. It pictured distant starships, flat as cutouts. Only one, closer than the rest, seemed three-dimensional. I leaped

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to the conclusion that we had shaken off all of the enemy swarm except for one.

Zeph muttered, "Astrogators don't rubberneck. Always watch the window!"

The Dire Icons assembled themselves into a pattern. An ominous pattern. Zeph hissed, "We're being herded into a trap!"

Kluge cried out with real fear in his voice, "They want us!"

Plerion reached between myself and Zeph. "I'll try something different!"

I heard Sinter ask, "Are we ready?"

"By now I'm sure everyone's said their prayers!"

The throb of the engines, shivering the ship's structure, told us it was a maxenergy jump. I did the wrong thing again. I looked around. The panoply blurred, it went blank, dark, starless. We had jumped into the uncertain constellations. And the image-generating brain of *Dragonfly* did not know what to make of it.

Then stars wavered back onto the panoply. An incomprehensible dull surface blocked out almost half of the stars. A combination of curves and angles and albedo. An enormous strange thing no more than a *Dragonfly*-length away.

Plerion gasped. "No! Damn!"

"That's camera-visual—collision course!" screeched Kluge.

"It's a Nameless warship—get us out of here!" Sinter yelled.

"I'm lost!" Zeph answered in a strangled voice.

"Do something!"

Plerion leaned over the astrogator's console, muttering, "I'll try again, oh damn!" Her hands darted over the console. "Remax!"

Louder than ever, *Dragonfly*'s hum shook my blood. For the second time, the panoply darkened, starlight gone. The astrogator's window emitted flat golden light that turned Zeph's face to stone, stone with hollow eyes.

The panoply filled up with stars again. Stars that wavered, oozing and eddying. Nebulas crawled in different directions as *Dragonfly*'s computer brain tried to reconcile where it thought we should have been with what its instruments registered. Jumping through the uncertain constellations had confused the computer. The computer's confusion on the panoptic sphere surrounded us like a feverish sick cosmos.

"Watch the window!" Zeph ordered me harshly.

The Dire Icons had all shifted to the far edge of the astrogator's window. Plerion slapped the console, calling up data which scrolled across the window. Then she cursed *Dragonfly*.

As if the engines brimmed with energy, spilling energetic bits, *Dragonfly* shivered. Sinter called out to the engineer, "Rose—end of emergency." Slowly the shivering eased.

"Not a moment too soon," came the engineer's voice. "Number Five slid. I thought we'd have to get rid of it. Consider us limited to four until I straighten up things down here."

The panoptic sphere normalized. "Computer's using 100 percent of its cells," Kluge reported.

"Look sharp," Sinter said to Zeph. "If the warships give chase—"

Plerion interrupted. "Reconstellate," she told Zeph. "That way." She named a series of points. "They won't chase us because they have no idea where we

went. We'll proceed to a safe place to lie low for a time. There."

Sinter nodded curtly. "Where is there?" he asked Plerion.

"A good place to lie low."

"Fine. But where?" Sinter repeated.

"I don't know," Plerion admitted.

"I'll have to think about it."

"Zeph?!"

"I can't tell where we are in constellation space. We're disoriented," the astrogator said unhappily.

Kluge rolled his eyes. "And we can't broadcast a come-find-me signal to *Helion*, not with a swarm of enemy in this end of space!"

With an uncharacteristic cool correctness, Sinter said, "Plerion, do let me know when you have an idea about where we are." Sinter folded his arms. "We've got to get back to *Helion*. The tactical mission is over. It failed."

She lashed out at him. "Your ship failed! It botched the job in an unbelievable way—it jumped directly toward the Enemy! That wasn't my intention. Your ship did that!"

Coldly, Sinter answered. "I beg your pardon. You tried an unscheduled and unprecedented tactic. This is a proven ship. The failure was in the tactic, or possibly the tactician."

"In no way!"

Sinter turned to me. "Rose needs an extra hand. Go."

But I dragged my feet. On the star-bridge behind me, I heard Sinter's voice, cold as ice. "You had better figure out exactly what happened and do it in a hurry, girl."

She was furious. "I am not a girl! I have a Name and you know what it is!"

"Then conduct yourself accordingly."

The starexplorer had the oldest, simplest kind of artificial gravity. It spun around its axis. Floating, I pulled myself along by my hands with *Dragonfly* spinning around me. My nerves were still fired up with adrenalin and flinching from Dire Icons and uncertain constellations; I clumsily missed some of the handholds that spiraled around the axis, my fingers skidding on the grainy wall of the axis. But the night lights, spiraling with the handholds, had a reassuring effect on me. Plain and familiar, they glowed orange in the night.

At the well down to the refectory, I called out, "Dally? Are you down there?" No answer came out of the well.

Even though the axis was a weightless corridor, the engine ring seemed down. A long way down. Finally I swung into the last well on the axis. I descended the ladder.

Dally stood there, hugging himself against the cold of the engine ring. He gave me a strained smile. Rose was tense and busy, and I knew enough engineering to vaguely understand why. The power of starflight came from *Dragonfly*'s own black holes—singularities of much less than stellar mass—controllable but not tame. There were four, two dyads, a stable arrangement for such things in the engines of starships. *Dragonfly* had a fifth black hole as well. Its position was adjustable. Certain configurations let the ship access the high-energy constellations at the expense of safety: the fifth black hole could break loose. In our final flight from the Enemy it very nearly

had. Rose had managed to get Number Five back under control. But surges and slacks of power had gone through the control circuits. Rose touched a series of switches. They retorted, sparked at her. "Kluge! Help." The communication net all over the ship was still open. To me, she said, "This has never happened to us before—and I certainly hope it never happens again!"

Dally said, "Poor Hiss is hiding somewhere." He meant the ship's cat.

"Dal, go sniff around the ring," Rose ordered. "Burnt smells, chemical leaks, tell me. Cob, help me open this panel." Rose tossed me an unfastener.

Kluge clattered down the ladder with his tool kit. "Where's the problem?" Rose pointed at the engine control circuits, uncovered now, and visibly melted in places. Kluge unpacked his thin spidery tools. We waited for him to render a verdict.

The daylight had not come on, nor would they. It would have taken a more serious crisis than this one to make Rose ask for daylight in her engine ring when it was supposed to be night. Day and night had been given to us by Earth, and were holy, inviolable. And we could see in the dark anyway—our eyes registered the near infrared wavelengths. Looking away from Kluge and the emergency light shining over his head, my eyes adapted. In shades of gray I could see the floor curving up in the two directions perpendicular to the axis. Massive braces, like ribs, jutted out at regular intervals along the ring. Centrifugally up, massive plates, the engines' plating, tessellated the ring.

I sensed the black holes in their cryogenic crypts: the presence of mysteri-

ous power. Maybe it was their gravitational effect, bending the fabric of the local universe, that registered on some obscure physiological sense. Maybe it was my imagination. The power and the cold in the engine ring unnerved me even more than usual in this dangerous night. I admired Rose very much, but I could never become an engineer. The engine ring was too far from the glory of the starbridge and too close to the power of the black holes. And too cold for me. Cryogenic cold leaked out of the engines. Rose usually wore warm clothes, with a hood and a mask to cover her face below her eyes.

Kluge reported. "Can fix."

Rose sighed relief. Then she reported to Sinter on the bridge. "We'll soon be fit to fly. Do we know where we are yet?"

"Yes," he said. "Zeph and the tactician have figured that out. I'm coming down."

Through the communication net, Rose had heard everything that happened on the bridge during the crisis. Now she turned the net off. "The tactician," she remarked, "is quite as brilliant as we were led to expect. But—like my engines—not altogether stable at her highest brain energy!"

Dally came back. He reported, "Two leaks and a fried circuit." Rose made a disgusted face.

When Sinter came, he immediately went to Rose. Husband and wife, they hugged each other. Sinter said, "Our ship almost *collided* with the Enemy!"

"Five almost got away from me," she said quietly. "But it's back in line."

"What was it like?" Dally asked eagerly. "The tactic, I mean."

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"Weird as all get-out!" Kluge said emphatically. "The panoply went *dark*."

Zeph said, "Like a dream." He had appeared at the door of the engine room. His voice sounded oddly flat. "Like dreaming of dying and going not to heaven and not to hell, but a dark place."

"Well, anyway, we got away from the Enemy, and in one piece, thanks to Rose and Plerion!" said Kluge.

Zeph said, "Yes. We do have Plerion to thank. Yes."

Rose said, "It's time for rangers to talk in private."

Sinter nodded. "Plerion's taken the astrogator's watch. You're dismissed, Cob."

Sent away again, I felt like crying. I went back up the axis, and ducked into the well that led down to the refectory, our dining hall. The hall was long, large enough for thirty people to share a meal. High on one wall of it was drawn the Dawn Icon. The huge circle, circumscribing a square, represented a planet. It was divided in halves bright and dark, day and night, with the terminator a spindle that broke out of the bounds of the circle. Gilded, the Dawn Icon's spindle glimmered faintly.

I felt less agitated, but now hungry, famished. It had been a long time since dinner. Everything had been wonderful and right, then.

Traditionally, the first meal on a ship's journey was a festive one. This time *Dragonfly* had departed from *Parhelion* with a skeleton crew and only one guest. Having such a small number to feed, Dally outdid himself in culinary artistry.

The foodstuff came from culture vats. Dally had tinted and shaped foodpaste into a reddish-brown fish, complete with scales and shiny black eyes and rippled fins. The fish posed as though swimming, on a bed of ruffled green seaweed. Our stiff translucent sort of foodstuff Dally had carved into geometric shapes, stacked on a tray in an elaborate lattice. He had made cakes of rougher and more fibrous stuff—intensely flavored cakes, some sweet and some not. Besides the other food on the table, a peach lay in a golden dish. The peach was real. It came from a tree in the gardens of *Parhelion*.

In a niche in the wall of the galley, a rough-textured vase held roses—white petals touched with pink and yellow. At the low table, where we all sat on cushions, Dally put the two adult women next to each other on purpose. They were a study in contrast. Compact and dark, Rose had brown hair, brown skin and eyes, like most of my people and like me. Plerion, taller and more slender, had green eyes and a rare reddish-gold shade of hair. And her temperament matched her striking looks.

In short order, we learned that Plerion was a theoretical mathematician. Analyzing the mathematical basis of the constellations, she had discovered a whole new aspect of starflight. Many experts were convinced that what her theories predicted would be feasible in practice, with the effect of revolutionizing starflight and not incidentally giving us a tactical advantage over our ancient enemy. But the high admiral had shown great reluctance to put Plerion's theories to the test. Only grudgingly had he agreed to send *Dragonfly*

on this mission. "He thinks we should study the ancient military texts first of all," Plerion said acidly. "For at least three generations of lives and brains! Not many agree—but the ones who do are the same kind of old fossil. Old and powerful."

Rose looked away from Plerion with a pained expression. The other rangers glanced at me. The High Admiral, the leader of the starship fleet that was our whole nation, was my great-uncle. Dally passed his sweet cakes around to a flurry of compliments, and then he changed the subject.

The meal ended when Rose sliced the peach. "Remember home," she said simply, and gave each of us a slice. She made less of a fuss over the ceremony than some people might have. It had more impact that way. We did remember. Earth was the paradise that the human kind left and then lost. Whenever my people departed from a safe harbor, or a mother ship, on any journey, we ate a piece of fruit in memory of Earth. Tradition called for round fruit, reminder of the roundness of a planet: peaches, oranges, apricots. I always wondered why the ceremony could not be done with a bunch of grapes.

Sinter and Plerion left, going to talk business on the starbridge. The rest of us stayed in the refectory. It was tacitly understood that Sinter would keep Plerion out of earshot for a while.

Rose spoke first, after Sinter escorted Plerion out. "There," said Rose, "goes the queen of the young Turks. She has a following among the military faction—the most militant of the lot. Mark my words, both the militarists and the traditionalists are waiting to hear how

Dragonfly performs for her. Do let's all avoid making mistakes!" Ruefully she inspected the cut on her finger. The knife had slipped as Rose sliced the peach, a minor accident from which she recovered so gracefully that it did not mar the ceremony at all. She had been inconspicuously pressing a napkin over the cut to make it stop bleeding. "She is beautiful. Those of you who like to look at women are in luck this time."

"With you here, we've never been out of luck," Kluge said loyally. "Awright, Dally, what's the inside track on the tactician?"

Dally, with his extensive social network, could find out almost everything interesting about anybody. He divulged that Plerion was a personal friend of young Prince Aurin.

"That explains a lot," Zeph said flatly.

Kluge disagreed. "Not even Aurin could get her made tactician, if she couldn't do tactics," Kluge said. Rose nodded thoughtfully.

Dally continued. Plerion came from a respectable family. But she was not theirs by genetic inheritance. Just where she did originate, genetically, seemed to be a mystery—or a secret, impervious even to his sources.

"That," said Rose, with amusement, "is one well-guarded secret, then!"

This sounded fascinating. It was pleasurable to hear, like the taste of Dally's sweet cakes, like the aromas of roses and tea. Feeling very alive, I wanted to be a ranger among rangers forever.

"I want dirt," Kluge said. "If any. Does she do anything but tactics and politics?"

Dally grinned wickedly.

Plerion had left in her wake at least two distraught lovers (both male). One of the two attempted suicide. The other talked wildly about taking a vow of celibacy and joining a priestly order.

"Oh, how terrible!" Kluge exclaimed. "She sounds like a black widow!"

"You're in no danger. She won't spin a web for your ugly face." Dally could get away with saying things like that. "On the other hand, a handsome single fellow like Zeph—"

Zeph had a sharp, brooding air about him. "She's crazy," he said. "She's spinning a web of dangerous ideas."

"I wouldn't say crazy," said Rose. "Speaking of spiders—" Rose pointed at me. "I think she's related to you, Cobby."

I stared dumbly at her.

"That Plerion is part Guardian in the genes," said Rose, "Or I'm an onion! The same sense of righteousness, insisting on the true and the right. Mind you, she has her own ideas about what is true and right!"

"Our Cob isn't stuffy like most of the Guardians." Dally hugged me. I grinned. These people, the core crew of *Dragonfly*, were close as family to each other. Tonight, finally, I felt almost like one of them.

I ventured, "The high admiral's even more, well, conservative than the rest of the family. All the family says so."

"Reactionary, perhaps," said Rose. "But Plerion underestimates him, if she thinks he's just an old fossil."

Zeph looked grimmer than ever. "I hope he doesn't underestimate her."

"Are you afraid her ideas are wrong?"

asked Dally innocently. "Or that they're right?"

"I don't want to find out!"

Rose said serenely, "This is Sinter's ship and mine. We won't permit anything bizarre to happen."

Our whole dinner, and our merry gossip, had taken place in one end of the refectory. Now, night-dark, the whole hall smelled of the roses in the vase. The Dawn Icon glimmered its eternal message of ceaseless change. I went looking for food, and found some of the basic stuff that Dally had not made beautiful yet. I should not have been so hungry, I thought. I had stuffed myself at dinner.

Dragonfly trilled, its communication net signaling that we were under way again. That meant I ought to go report to Zeph. The trill's echo in the refectory had hardly died away when Sinter came in, looking for me. "Cob, I've a question for you." In the darkness, he loomed, a tall gaunt man, with an unreadable expression. But his voice sounded hard. "Why did we change course—toward the multiple star?"

I choked down a mouthful of food. "Plerion—I mean I redirected the ship!"

"Under what circumstances?"

Raggedly I described all that had taken place on the starbridge after Plerion arrived. Sinter listened with his arms crossed. When I finished, he said, "And you thought she had the right to do that?"

"I thought so."

"Think some more, then!"

"She's military, and a tactician—"

"The military do not rank over rang-ers! Not now. We're not at war yet,

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however much some of them want it! I captain this ship. Plerion may dictate a major course change only in the presence of the enemy—or in a situation of tactical practice—and even then *only* with my approval. Or if I am completely incapacitated. Didn't we teach you these things?" Sinter sounded very angry.

I hung my head. "Yes, sir."

"Did she charm you into doing what you knew to be wrong?"

"I wanted to do it. I really wanted to direct the ship!" I confessed.

"That's natural. The problem is that you *did*." He was silent for a while. Hardly able to breathe, I waited for my doom, expected him to banish me from *Dragonfly* effective as soon as we got back to *Parhelion*.

"At least you didn't tell me it was all her fault. You owned up to your part in this debacle." Then Sinter said, "If anything like this ever happens again you are out of *Dragonfly* for good!"

I caught my breath. "Sir—do you mean I'm not out now?"

"Hell, no. You're on probation. That's all. That's serious enough."

Then I did cry. Sinter waited for me to get the sobbing under control. He said gravely, "You don't want to be a standard-bearer for tradition like most of your relatives. Fine. Then you have to think for yourself about what's right and what's wrong."

"I thought it was always right to explore."

"For *Dragonfly* it is. That's what starexplorers are built to do. For human beings, things aren't so simple."

Earnestly I asked, "Should I go back to my duty station?"

He nodded. "We're on our way back

to *Helion*. I think Plerion wants to stay at the astrogator's window. She's trying to figure out how her tactic went wrong. But that's correct—you should report to her. Just don't do anything for her that you shouldn't!" he said sternly.

I hurried up to the starbridge. Plerion sat in front of the astrogator's window, brooding. I thought about how she had gotten me into trouble and *Dragonfly* into danger. I scuffed a foot.

Plerion said sharply, "What do you want?"

"My watch back, or your leave to return to my quarters for the night," I said stiffly, "Tactician."

Not for the first time, and not for the last time, she surprised me. "Mad at me?"

"Sinter just reprimanded me. But he is a just captain."

"Meaning you're not in serious trouble, and I am. Yes, I guessed that there might be a nest of enemy at the multiple star. It was the kind of place where they like to make their nests. I really expected to get *Dragonfly* out of there dramatically and easily." One of her hands rested on the console, by the controls. "Unfortunately for me, your captain is right. *Flyer* did not fail. I did." She called the starexplorer by our nickname for it. "I failed to take into account that *Flyer* is not a military ship. Most of which are new and incurious."

Stars, because we were moving, proceeded across the panoply. A nebula went with them: a tangle of shining gas, the remnants of an old supernova, the kind of nebula called plerion. "*Flyer*," said the woman, "is programmed to warn of enemy ships, but that programming is relatively superficial. There is

absolutely no reflex, deep down in *Flyer*, to avoid the enemy or anything else in all creation with the exception of star-massive black holes. On the contrary. *Flyer's* most basic reflex is to investigate things.

"There was an uncertain constellation radiating out around the enemy warship—generated by the warship's engines, its black holelets. *Flyer* just crossed that uncertain constellation to the source—like stepping stones—proceeded to investigate that significant entity—our Enemy!—up close!" Plerion's laughter had a bitter edge. "I failed to exclude that option when I sent *Flyer* into the unknown constellations. I should have gotten to know *Flyer* better before trying the tactic."

It sounded like a confession of sorts. Approving, I nodded sagely.

"Do you have a string on you? Do something with it."

The starbridge did not strike me as the right place to play with string. But it wasn't wrong—not like redirecting *Dragonfly* for her had been wrong. Taking the long, supple loop of string out of my pocket, I sat down, cross-legged, and did a complicated figure, turning the string into a patterned web between my hands.

"Ah. You're good at that."

My people did string-figures as something of a national pastime. We found very good entertainment value in our pieces of string. I was better at it than most, and my nickname meant a spider of the orb-weaving kind. "That's why people call me Cob."

Plerion said, "Thought so! I play too. I seem to need to toy with things, string, puzzles, when I think. I should not have

left my puzzles at home on this trip! May I borrow that?"

I held up my hands for her to take the string, picking some strands up and pulling them, transforming my figure into another. She squinted at the string. "Ah, damn it. I need more light." She switched on the bridge light. Her green eyes were defective, not good for seeing in the dark. She laced the string into yet another figure. Somewhat absentmindedly, she frowned at it.

I looked away from the light. On the panoply, the plerion dwindled. I wished we could have explored it, could have seen how it spanned the night sky of a planet.

"Plerion" was a nickname too, an uncommon one among my people. Sinter, Rose, Kluge were nicknames—Rose a very common one. Sinter sometimes called her Rosy. Nicknames, of which most people had several, surrounded the lives of my people, like electron orbitals, bonding us to each other. The nucleus of one's life, one's soul, was a different matter. Every adult had one true name, a Name. As a rule, someone's Name was neither common knowledge nor an undiscoverably deep secret. I wondered what Plerion's true name might be. It would have been uncouth to ask her outright. Sinter knew. She had to give her name to him, the captain, when she first came aboard this ship. But it would be hard to pry her name out of Sinter, on account of his rectitude.

Plerion said, "My theory's almost perfect. The application under field conditions is—harder than I expected!" She twisted the string. Then she said dryly, "When experts tell you that something

is easier to theorize than to do in real life, you ought to believe them, even if they aren't as smart as you."

Rose had friends who knew what Plerion had been like as a child. She had run her caretakers ragged, seeming to need no more than a few hours of sleep a night. And she had terrorized her teachers: knowing all of the answers to their questions, asking questions for which they knew no answer. Now she had no one but herself to ask. Sweat beaded on her forehead, dampened the fringes of red-gold hair against her dark skin.

"The beauty of it," Plerion murmured, "is that *they* trust the old constellations just as much and just as blindly as we always have. Earlier, when I took *Flyer* into the unknown constellations, we disappeared from the Enemy's windows. *They could not detect us*. I'm sure they saw us when *Flyer* had that close encounter with the warship. Before they decided what to do about it, I took *Flyer* into the uncertain constellations again, and we vanished for good, as far as the Enemy could tell.

"If I can only master the unknown constellations—we can start the war with the Enemy. And win it! Do go," she said. "I'm thinking, and I'll keep your watch."

In astonishment, I left my string with her. I went to my own room in the living quarters, where I unrolled the mat to sleep on. I lay down and then stared at the darkness. After the light on the bridge, the darkness in the narrow room bothered me—it made shapes indistinct. The ordinary things—a small low table, the box that contained my few dearest possessions—looked shapeless.

In my heart of hearts I felt indistinct. I felt shapeless. Tonight I had directed *Dragonfly*—into near disaster. Before that, I had astrogated for half a night. And even then, I realized, before anything went wrong, *it did not feel right*.

I tossed and turned. Did I really want to be an astrogator? No, I admitted to myself. No. The constellations, certain or uncertain, interested me, but not enough to make me want to live them the way Zeph did. More attractive to me was the hope of exploring strange worlds under new suns. All of my life, all fifteen years of it, I had been dreaming about worlds with skies and seas, life and color.

But the rangers were not exploring planets anymore. Not since my people stumbled across the Enemy, to our collective horror and consternation. For my nation's security, for military reasons, the highest priority had been placed on mapping constellation space. So astrogators were needed. I could be trained to astrogate, but not to explore planets. That vocation was precluded because my people had found the Nameless Ones but had not decided what to do.

Exhausted but sleepless, I recalled fragments of the ongoing and bitter debate of my people with themselves.

"Maybe the Nameless Ones have changed."

"They cannot change! That's why they're evil!"

"The universe ought to be cleansed of them."

"Are we the wrath of God?!"

"Why not?"

"No. We will wait and watch until we understand these things." That voice, that finality, belonged to the old man

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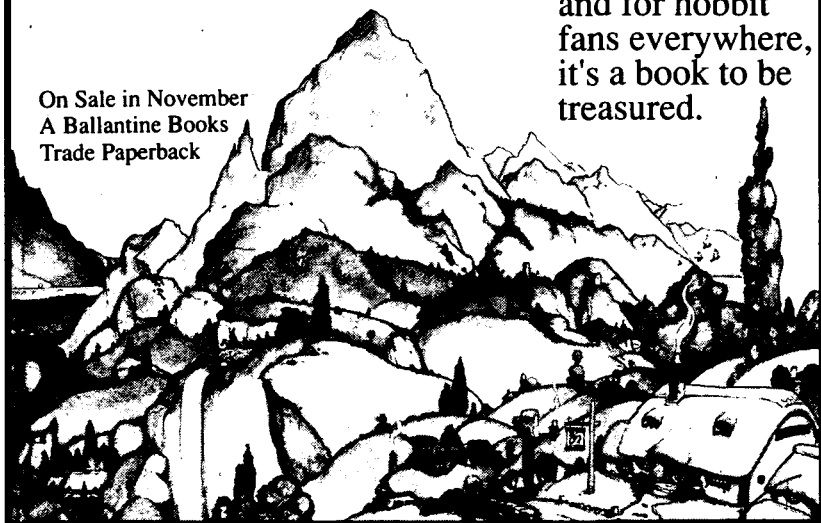
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who was the high admiral of our star-fleets, my great-uncle.

"Maybe we had to find them sooner or later." Sliding into a dream, I heard Sinter sounding serious and sad. "But I wish it hadn't happened in my day. We're being co-opted by the military."

Plerion's words: "We could start the war, and win it!"

And Kluge's terrified cry: "They want us!"

Something hit me in the stomach. I woke up with a start and a strangled scream, and the cat sprang away.

Hiss had jumped down from the air duct which served her as a cat path. She had landed on me. Shaking, I coaxed Hiss back to me and gathered her up into my arms. She purred uneasily.

I had to think about something else besides Nameless Ones. And what presented itself, to preoccupy my thoughts, was how I had failed tonight. At a crucial moment I had unthinkingly done exactly the wrong thing, and directed the whole ship into danger. I had let the rangers down.

Hiss crawled under the coverlet. I curled around her. Cats were called by nicknames like Hiss. The cat knew its Name and would never tell it, or have to. In slightly more than a year, I would be old enough for a true name. My Name. My life's shape. And I could not imagine what it would be. I felt like a shapeless and useless portion of personhood. Apart from the soft purring warmth against my stomach, I was miserable.

A trill roused me. Essentially it meant all-hands-on-deck. Leaving Hiss under the coverlet, I hastily made myself presentable, and dashed to the starbridge. We were preparing to rendezvous with

Parhelion. I desperately wanted to redeem myself. With my face scrubbed, clothes on straight, I stood by Zeph, ready to be his third hand—though not a very gifted third hand—when he needed me. But he did not even speak to me.

Dragonfly hummed, its engines working hard. The astrogator's window was full of constellations, sparkling blue and red with the rapidity of our travel.

Plerion was unimpressed. "A thousand years of this," she said. "No innovation."

The voice of Rose spoke from midair over the starbridge. Rose said, "A thousand years of exploring the stars."

Plerion's mouth twisted into a frown. "Not very well. These old constellations access a very small part of space."

"Quite enough to keep five hundred generations of humans busy exploring. Or five hundred thousand generations."

Evidently the calm, disembodied voice bothered Plerion. She snapped, "That's a hell of a long time to live a collective lie!"

"Lie?"

"The constellations!"

Zeph jerked. He was rigid, the muscles of his jaw knotted. Without saying anything, Sinter put a hand on Zeph's shoulder.

Plerion went on, "They don't exist! They are a comfortable delusion. Out of line with the reality of the universe."

"No. The constellations are quite but not ultimately true," the voice said. "People can't live with the ultimate truth in its totality. No more than the human eye could stare at the blazing Sun in the blue sky of old Earth. You'll

learn. We need our limiting conventions.”

“And our grand illusion?”

“And what is that?”

Rose sounded pleasant. Plerion, on the other hand, was losing her temper. She gestured at the panoply, even though Rose, in the distant engine ring, could not see the gesture. Kluge suppressed a snicker. Plerion said, “The illusion of the whole galaxy around us—the relative motion of the stars—as if we’re going faster than light, in a straight line, in real space! It’s false!”

“The panoply is true, but it isn’t about *us* at all. Think of it as a hymn of praise for the Maker of the stars.”

Steaming, Plerion started to retort. Sinter said, “Peace! You can hash it out with Rose once we’re safely home.” *Dragonfly* had begun the final approach to the location of *Parhelion*.

Then the warning sounded, ringing ENEMY. A Dire Icon appeared on the edge of the astrogator’s window.

“Go faster,” Sinter said shortly.

Dragonfly’s sturdy engines hummed more vigorously. The starexplorer flew so fast that Zeph’s constellations scintillated.

“When we encountered them yesterday—” Sinter said tightly, “that might have stirred them up. Tactician?”

Plerion nodded shortly. “It’s possible. —At this rate we’ll reach *Helion* very soon.”

Sinter said, “If something of hostile origin appeared in a fleet under my command, and got away, I’d go looking for it and for where it came from! Or don’t the Nameless Ones think that way?” Sinter and Plerion had both moved close

to the astrogator’s window, crowding by me to watch it.

Suddenly a cluster of Dire Icons spilled onto the window, at the rim of it. The alarms in *Dragonfly* rang and rang again. With a sharp intake of breath, hissing between his teeth, and a wave of his hand, Sinter gave *Dragonfly* to Plerion. Plerion fired off new coordinates and Zeph made *Dragonfly* sidle away from what the cluster of Icons represented. Not all of the Icons were Dire. In the midst of the red triangles we saw a single green spindle, flashing urgently. Sinter said an unsteady voice, almost not loud enough for Rose to hear, “*Helion*’s under attack.”

Rose heard that. “Please,” she said. “No!”

Plerion said bleakly. “Yes. We stirred the Enemy up—I stirred them up with *Flyer*—they swarmed and they found *Helion*!”

Smaller flecks darted around the constellation of Dire Icons. Then one fleck dissolved. “That was one of *Helion*’s patrol boats!” Sinter groaned. “Wiped out—! They’re trying to fight off the enemy. Outgunned as all hell! Where are our warships?!”

Plerion shook her head sharply. “Still far away. This end of space was thought to be clean.”

Her words came to me remotely, as if through a plate of glass, a pane of unreality. I could not believe this: *Parhelion*, with its gardens, and my best friend—the names I loved most in all the universe—attacked by the Nameless Ones. Worst of all, it was partly my fault. It had all happened because I thoughtlessly did what Plerion asked!

Then Plerion said, "Sinter, Captain, we can try to save *Helion*."

"We don't have weaponry. None!"

"We have Five."

Sinter said, "I've heard of that tactic. No. We can't get that close before the enemy sees us coming . . . hm . . ." He nodded slowly.

Rose spoke up, calm. "To the extent that I understand your game, I've the impression that we can't play it without Number Five."

Plerion said, "Correct."

Kluge winced, but said nothing.

"Right now we have a better than even chance to save *Helion*. A less than even chance to save ourselves afterwards," said Plerion. "A fighting chance."

"Rangers aren't fighters," said Sinter.

"Except when they have to be," said Rose. In the heart of *Dragonfly* the engines shifted to maximize the available energy.

"Zeph?" Sinter asked.

The astrogator mutely shook his head.

Kluge exploded. "Man, this is no time to freeze! *Helion*'s in danger and we have to—"

"He can't help it," said Sinter. Taking Zeph by the shoulders, he removed him from the astrogator's chair.

"I don't have enough hands to do it all myself!" said Plerion.

"I can astrogate." Sinter took the seat himself. Nodding, Plerion reached over Sinter's shoulder to make the uncertain constellations fill his window. Sinter stared at them.

"The old ones are there. The brightest that flicker the least," I whispered. I had to force the information out. I felt

like screaming *It's all my fault—I'm sorry!*

"I see. In?"

Plerion answered, "Not directly." She gave him directions, unemotionally, already absorbed in the tactical challenge.

Sinter had some captaining to do first. Using the communication net, Sinter spoke to Dally. "Dal, pray for us," he said bluntly.

"I will," Dally's voice came to the bridge, soft and calm. Through whatever happened next, Dally would stay in the refectory, kneeling in prayer under the Dawn Icon.

Then Sinter called Plerion by her true name. "Tazalha, do whatever you can to save *Helion*."

In our language, *tazalha* meant supernova. Glorystar. Sinter wanted the rest of us all to know Plerion's true name, because it implied brilliance of mind—genius that might save *Parhelion*.

We skirted *Parhelion*'s terrible peril. I tried to keep my eyes on the window, but stole glances at the panoply anyway, rubbernecking. The image horrified me. *Parhelion* maneuvered. The Enemy swarmed after it like angry bees. Another green fleck dissolved. Sick, I turned away from the window. Zeph stood to one side, staring fixedly at the panoply. There was something sickening about him, too. I wanted to shake him and turn him back toward his window, his life, the crisis that needed his expertise.

"When?" Sinter whispered.

"Not yet." The window flowed, it snowed with uncertain constellations. But Plerion was still using the old

ones—threading us into the enemy's midst surreptitiously but not undetectably.

Rose's voice asked, "Can't we jump in from this distance, your way?"

"Not if you want to keep your Five under any kind of control."

"Understood," said the engineer.

"Your new ways aren't very reliable," Kluge grumbled.

"No, or they would have been known and used a thousand years since!" Plerion snapped. "Fourcon, six-zee-ten!"

Sinter obeyed Plerion. He piloted *Dragonfly* from point to point to point. Close to him as I was, I saw that Sinter was sweating in his tense concentration. For me, last night, directing *Dragonfly* had been thoughtlessly easy. It had been child's play.

Staring at the window, Sinter said, "*Helion* is cornered now."

The enemy had seized positions at all other points of *Parhelion's* last constellation. *Parhelion* had nowhere to jump.

"I see that," Plerion said. "When we go out of the normal constellations, I will make that move myself. The timing is crucial to the instant."

"If it's missed—?"

"We cease to exist in this universe," she murmured, so that only Sinter, and I, heard.

Suddenly we found that we had attracted the Enemy's attention. It took the form of two attack boats, wicked long thin shards of ship, coming after us. Plerion called, "Rose! Here goes—with maxenergy!" She touched the astrogator's controls. The sphere went dark but not blank, had a sketch of stars on it. *Dragonfly* hummed in-

tensely. I heard Kluge murmur, "Holy mother Terra . . ."

We came out at a new point in the old constellations. The Enemy boats that had been charging us flew away, bearing down on a position other than ours.

"Well," said Plerion, standing straight. "I seem to have reached an understanding with *Flyer*. It did what I asked! and—" she gestured at the panoply, "made some sense of it. This is a good ship. Reconstellate."

Kluge studied the scene on the panoply. "Look at 'em. No idea where we went to."

Dragonfly resumed its zigging and zagging toward *Parhelion*, engines' hum intensifying and slacking. I stared at the astrogator's window. The deadly constellation around *Parhelion* was getting more complicated. Finally I could stand it no longer. "Why are there so many more things around *Helion*?" I asked.

Sinter shrugged. Plerion said, "The Enemy is letting their attack boats out in force. To close in for the kill. So now there are lots of little starships flying around! Rose! Can we max again now?"

"Yes."

Plerion took us into the uncertain constellations again. The stars on the panoptic sphere faded to a sketch with one tiny blotch on it. That blotch swelled huge. Then the panoply normalized. We had jumped across uncertainty to reach a constellation point already occupied by one of the warships. Two or more ships could occupy the same point, more like a zone than a true point. But we ended up appallingly close to the warship.

The panoply showed it to us. *The*

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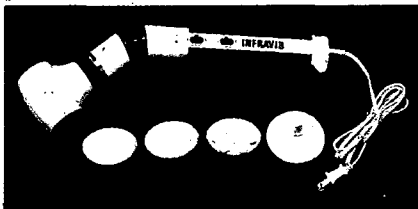
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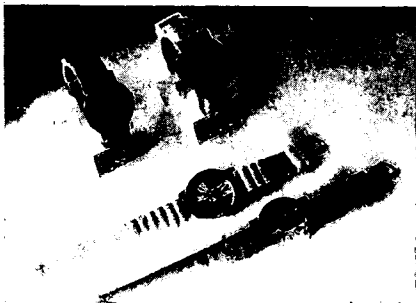
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Shapeless. Huge, rotating, the eidolon had angles, as of something artificial. It also had turgid and branching parts like something organic—and pulsing surfaces. It was an unholy amalgam of the mechanical and the biological—as though miscegenated from the art of the creator and the science of the rational creature. *Uncreated!*

Data scrolled across the panoply under the eidolon. *Dragonfly*—dwarfed but not intimidated by the warship's monstrous bulk—was busy investigating. "Kluge," said Sinter, sounding shaken, "Monitor the information we're collecting. Think military intelligence."

"Right." Kluge's voice cracked. He was scared too.

Plerion said intently, "Rose, get ready to let Five go!"

A vibration came through the ship's structure. In the maximum-energy configuration, the fifth black hole could slide out of place, get loose, endanger the ship. So it could be ejected out of the engines. That was intended to be a last-ditch, dire-emergency option, with no fine control, just getting rid of the thing. "Less than one minute and it goes," Rose reported. "Can't stop it now."

"Hold, hold for thirty seconds!" The seconds fell slowly and heavily. "Hold fifteen more seconds!"

"I'll try!"

The Enemy warship rolled by, bigger and uglier than ever. Every second increased the likelihood that it would notice *Dragonfly* as an intruder. A vast indentation in the warship came into view, a rift in the armor. "Star gate!" Kluge crowed.

"Rose, let it go!" called Plerion.

"Done," Rose said briskly. *Dragonfly* shimmied as it ejected Five from its engines.

On the screen, Five sailed away from us. The eye could not have seen it in normal space; *Dragonfly* depicted it as a shiny black egg. The egg fell toward the warship's star gate, even as several slivery ships proceeded out of the gate, the tail end of the warship's emission of attack boats.

"Away!" Plerion said urgently. She named a coordinate. Sinter guided the ship reflexively. We scurried away from the warship, Plerion hoping to thread our way out of the enemy fleet before they noticed us. There would be no more disappearing tricks without our fifth black hole. We could not even use the high energy constellations without Five.

On the panoply the misbegotten warship split apart. Great cracks in it let out brilliant momentary flashes—fire extinguished by the vacuum of space—and vents of outgassing vapors. It broke into pieces.

Some of the rangers laughed and shouted. I hated the Nameless Ones for attacking *Parhelion* and for killing some of my people. I shrilled a curse. Sinter called out, "Engines stable?"

Rose answered, "Yes. Did we get the bastard?"

"Yes! *Helion's* free!" With one warship gone, one constellation point clear, *Parhelion* could escape from the Nameless Ones's trap.

Shattered, the enemy warship dissolved into a mass of wreckage. The ruination swirled, whirlpools forming in several places. Black holes, including the warship's own, loosed from the en-

gines that had contained them, were feeding. The whirlpools emitted fitful radiation from matter being ripped into elementary particles.

In the next moment *Dragonfly* cried alarm. Attacking enemy were after us. We could afford no more concern for *Parhelion*, whether it got out of its doom or not. We were running from our own. Plerion made *Dragonfly* dodge, skip, eluding the Enemy. There was no physical sense of accelerating or turning—inertia is a function of normal space, not starflight. Abandoning communication silence, Kluge sent out distress calls to our people.

Three enemy boats closed in on us from different directions. Plerion found a point to jump to, left the enemy veering away from a collision with each other. This time, though, they saw exactly where we went. They reconstellated and kept coming.

Plerion clenched her fists. "I hate running!"

Sinter said evenly, "Keep it up. Where now?" In reply she rattled off a string of new coordinates.

The Nameless started shooting at us. They had weapons of the type we called starbolts. *Dragonfly*'s brain painted the bolts on the panoply, spears of red light.

A starbolt glanced on the surface of *Dragonfly*. It glazed the panoply. The astrogator's window went crazy, incoherent. Zeph suddenly shook off his paralysis and leaped to the controls. He made *Dragonfly* tumble away from the enemy. Somehow he and Kluge between them damped out the oscillations in its astrogating instruments, and got the constellations back in the window. I could do nothing. I bit my lip against

wanting to cry out, *I'm sorry!* I tasted blood.

Then we made a definite jump, a calculated one. Starbolts lashed the point where we had been. Sinter moved away, giving the astrogation back to Zeph, without comment, except to say, "That was an attempt to disable us. It failed."

A pealing tone sounded and new Icons appeared at the rim of the window: blue spindle shapes. That meant our people, better yet, our battleships, among them the flagship *Solaris*. Plerion and the rangers were busy keeping us alive. I alone had an opportunity to watch the fighting. My people began as enemies of the Enemy, warriors who lost their homes while winning the war. A thousand years later we still had the skill and the will to fight. Flanked by smaller attack ships, *Solaris* broke the first rank of the Enemy that it found in its way.

With such vengeance bearing down on them, the rest of the Nameless ships began to scatter and run. But for one last gesture of enmity, for a parting shot they tried to obliterate *Dragonfly*. Starbolts hailed across our constellation.

Plerion almost got us out intact—almost. The starexplorer took one direct hit. *Dragonfly* quivered. Damaged, part of the hull contracted, automatic mechanisms trying to seal a rupture by telescoping the hull. *Dragonfly*'s convulsion knocked me off my feet. Scrambling up, I noticed the *Dragonfly*-hologram over the starbridge. It flashed red in the middle of its long thin shape. "Almost severed," Plerion said tonelessly. "It's over for us."

Sinter called, "Rose! ROSE!" he shouted. She did not answer. The starbolt had broken *Dragonfly*'s commu-

nication net. He whirled toward me. "Go find out what's happened back there!"

Afire with adrenalin, I bolted. In the middle of *Dragonfly* I found the axis bent and buckled. Air escaped into space with a thin scream. Scared, I hesitated and screamed, "Rose! Dally!"

A faint reply came from far ahead and down. "Help!"

I had to go down there. I skidded on the wall of the axis. The remaining set of black holes had been dislocated—or the ship dislocated around them. They caused a strange misaligned sense of gravity. The well down to the engine room slanted, the ladder in the well canted crazily.

It was dark in the engine ring, almost too dark for me to see anything. I cried out, "Where are you?"

"Here!" Twenty feet away from me, Dally moved something with a clatter. "Stuff fell down on her! Help me get her out!"

The engine ring was not a place of clean smooth tectonic shapes anymore. I stumbled across wreckage. Some of it had sharp edges. Cryogenic liquids' vapor steamed from broken lines. When I reached him, Dally was standing on a brace, trying to keep his balance and struggling with a massive plate—a big broken piece of engine plating. Grudgingly it shifted a little bit.

Thinking like a child, I looked at the plate hopelessly. Then I remembered that I was taller and stronger than Dally. And I saw how the plate was situated. "I'm going to lift right here because I think the whole thing'll move if I do!" I took hold of a corner of the plate. Rough frost covered it. Straining, I

lifted with all my strength. The plate tilted up.

Dally reached under it. Then he went completely in. "Don't let go!"

"It wants to snap back," I gasped. "Hurry!"

Dally scabbled in there. I panted with exertion and my fingers hurt from the cold. Finally he pulled Rose out. She moaned. Crying, tears icy on my face, I let go and the wreckage crashed back into its place. "We've g-got to go back up," I stammered, with numb lips. "*Flyer's* almost broken in two and if this end f-falls off—"

Dally was already trying to carry Rose up the crazy ladder. I leaped up after them, caught hold of her, and added my efforts to his. Rose moved but she seemed uncoordinated. Her arm slipped, slick with blood, in my hands. She said something unintelligible.

The cocked gravity in the axis seemed worse than before, and it tried to make us slide backward. Dally said, "Stop! She's bleeding too much—" He had a bandana in his pocket. We tied it around Rose's arm above the gash, as a tourniquet. Trying not to jolt her too much, we thrashed up toward *Dragonfly's* broken back. The axis slanted so badly that we put our feet in some of the handholds, using them like stairs. The orange night lights flickered on and off like candles in a wind—blown by gusts of electricity through the damaged ship's circuits.

Dragonfly shivered. Dally cried, "What was that?"

"That," said Rose, faintly but clearly, "was letting go of the rest of the holes. Automatic. I hope the enemy runs into them." She held one hand to her head.



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Where the axis was buckled, the whistle of escaping air sounded louder than before, rising to a howl. We plunged past the howling air that stirred our hair. Then we found a portal shutting in our faces. *Dragonfly* was trying to seal itself against losing more air.

"No!" Dally hissed. "Open! Open!" I fumbled with the manual override. The portal relented, opened, just enough to let us get through. "All right, *now* close, you twit!" Dally fumed.

I wheezed. My chest ached from lack of oxygen.

The three of us retreated into the refectory. There we huddled together, under the Dawn Icon. Nothing could be heard from the communication net: silence. Dally inspected and briefly loosened the tourniquet on Rose's arm. "Where else does it hurt?" he asked her.

"Headache. And—there—doesn't hurt, doesn't even feel."

"Frostbite, I think," Dally said.

I listened to them. I worried about the Nameless Ones. Had our people rescued us, or was *Dragonfly* adrift in space, mute and helpless? Could the Nameless Ones have wormed their way in through the damaged hull, boarded *Dragonfly*? I found Dally's longest kitchen knife. He kept it very sharp. With that in my hand I guarded Rose and Dally. If anything alien came in, I meant to stab it.

Something big charged into the galley. I raised the knife. Sinter caught my arm and lowered it. Recognizing him, Rose stood up, and he swept both of us into a hug. Dropping the knife, I clutched his shirt like a baby. "We're being towed," he said thickly. "By *Helion*."

Rose fainted in her husband's arms.

Gently he lowered her to the floor. "She got hurt and lost a lot of blood, but she'll be OK," Dally whispered.

The communication net crackled back to life. "Testing, testing, can you hear me?" said the net in Kluge's voice.

Dally answered, "Your voice is music to our ears, old man!"

Then we heard the attention signal, unmistakable, from the flagship of our fleet, followed by the high admiral's voice. The admiral wanted to know who had eliminated the enemy warship to let *Parhelion* out of the deadly trap. He waited for an answer. Had they not survived? Did anyone know the truth of the matter?

"Plerion—?" Dally whispered.

"May not be ready to talk to the admiral," Sinter said. "She fell apart as soon as we were safe—when I left the bridge she was crying. Kluge, transmit this." He said loudly and clearly, "Sinter of *Dragonfly* here. *Dragonfly* did it."

There was a pause on the other end. "*Dragonfly*?" the admiral echoed. "The starexplorer?"

"At the time, *Dragonfly* was commanded by Plerion, Tactician. Tazalha," Sinter added.

It was time for day to begin. The daylights came on, starting with a gentle glow, a luminescent dawn. The light revealed the bright red blood all over Rose. Sinter crouched beside her until the paramedics arrived.

Space tugs hauled *Dragonfly* in through the star gate of *Parhelion*. With its stern almost disconnected, airless and inert, *Dragonfly* was bundled into drydock. This transmitted strange little

jolts and shocks through the starexplorer. A few more things fell apart. The ship's day brightened into morning with wavelengths slightly out of kilter.

The medics rushed Rose away to *Parhelion's* hospital. Dally went with them, holding her hand. The rest of us left in a slightly more ceremonious fashion, first asking the captain for leave to go. Zeph cried on his way out of *Dragonfly*. Kluge carried away some delicate, damaged circuitry to fix at home.

Sinter called me into the refectory after the rangers. The Dawn Icon dominated the far wall, the spindle shining gold. Sinter had picked up the vase and its roses, which had been knocked down, and placed them back into the niche in the wall. Loose rose petals lay scattered on the floor.

Sinter bowed, to me. "She might have bled to death down there if you hadn't gotten her out," he said.

I blurted, "I'm so sorry it all happened and that I ever had a part in helping Plerion start it—!"

"As far as I'm concerned, you've made amends. *She* has not." He meant Plerion. He scowled. "Hell, she's gotten what she wanted and more! A chance to show her stuff. A starring role as a genius and a hero. She may have even triggered the war that she and her faction have been looking forward to! It still wasn't right to get *Dragonfly* into the nest of enemy in the first place. And she ought to be made to do some kind of penance for that. I don't know how. At this point I doubt that formal charges would stick to her. If this is war, even if it's victory, I hate it. I wish I could talk to Rose."

He seemed wrung out and bitterly

unhappy. I felt that I had to take Rose's place, to give him wise advice. At least I had to try. "Plerion has a will to righteousness," I said, and suggested, "I think she'd really do penance—if it was something that seemed right to her way of thinking."

"Maybe. Go get her for me."

Plerion, like the rest of us, was supposed to ask the captain for permission to leave the ship. She seemed edgy as a cat when she came into the refectory.

"Sit down." Sinter seemed stronger, sterner now; he had pulled himself together. "We have unfinished business, we three. You," he fixed Plerion with a steady gaze, "started this."

"I did not intend all that has happened!"

"I don't approve either of what you intended, or of what you did," said Sinter. "But I want to know why, Tazalha." Using her true name like that told her that he meant very serious business. "You have your faction behind you. You and your militant friends will outlive the high admiral even if you don't tip the scales of public opinion away from him. Why rush it?"

With her arms crossed defensively, she refused to reply.

"Cob, what do you think? Why did she have you redirect *Dragonfly* last night?"

"She wanted to show off."

"Were you showing off?" he asked Plerion.

Putting it that way obviously disagreed with her. "No!"

"No, Tazalha?"

She burst out, "I cannot wait for the admiral to watch and wait, test me, test

my ideas, for a decade or two. I can't wait for him to die, either!"

"Why not?" Sinter shot back.

"Being able to unravel the secrets of the constellations—" she said, "it's a mathematical talent, a kind of talent that peaks early in life. I can feel it. It's burning bright *now*. I've got a few more years. That's all!"

I listened, electrified. This implication of her name had not occurred to me. Tazalha: glorystar, supernova. Such a star blazes brighter than the rest of the galaxy, but not for long. A supernova fades fast. Then only a pulsar remains, in a tangle of radiant nebula, a plerion, where the glorystar had been.

Sinter said, "You are the smartest person I've ever met—but putting *Dragonfly* into that danger, confident that you could levitate out of it—was stupid!"

"What else was I to do?" she flared. "Would you waste my talent, while the old man ruminates—and while we lose the chance to settle our old score with the Enemy?"

She was right about the high admiral. The admiral would let her talent flare and fade and gutter, unused, before he would consider putting our people on a new and unprecedented course.

"I would have you look into the mysteries of creation," Sinter said evenly, "and leave the Enemy alone. The uncertain constellations must go somewhere else besides war."

"Then I respect you. You are a truth seeker. Not like so many." She spoke with the bitterness of old festering frustration. "The admiral, immersed in ancient military texts. The purblind astrogator of yours!"

"Not blind—blinded!" Sinter said quickly. "Believe me, he saw what you've uncovered, more clearly than anyone else, admiral included, I believe. It seared his mind's eye. It shocked his spirit. Zeph is brittle. That's not his fault." Sinter sighed. "I asked him to keep the truth about what happened on the starbridge last night to himself."

"You did?!"

"I did. Cob, can you keep a secret too?"

Buoyed by relief, I stood up and bowed assent.

He said, "We'll all say that I decided to investigate the multiple star—plausible enough—Plerion being absent from the starbridge at the time."

That startled Plerion. "A military commander—with his ship broken around him and his engineer in the hospital—"

"She's my wife. And my astrogator is on the brink of a nervous breakdown."

"A military commander would try to have me court-martialed!"

"I'm not military and I can't imagine what good it would do."

"I—then I have to thank you!" she said awkwardly.

"That's optional. What I really want is for you to make amends."

"Like what?" she asked warily.

"You used *Dragonfly* in order to get what you want—what you think you need. Hereafter, leave us out of your war," he told Plerion. "Use your influence in military circles to keep us uninvolved. No more tactical missions. No scouting and errand-running for the military, either, not even if we're at

war. The rangers' calling is exploration for its own sake. I want you to see to it that *Dragonfly*, at least, is free to do that."

Plerion considered. Then she announced, "It's fair. I agree!"

Sinter gave me an almost imperceptible, approving nod. He let Plerion leave then. "Go—Tazalha."

"Oh, wait." Plerion turned to me, holding out my string. "This is yours—thank you!" Then she said, "He's quite right. The uncertain constellations do go somewhere besides war."

"Where?" I asked.

Plerion placed the string in the palm of my hand. With a dazzling smile, she said, "Earth!" and on that note she left.

For a moment I fantasized vividly, imagined crossing uncertain constellations, not to clash with the ugliness of the Shapeless, but to seek our paradise lost, our Earth.

Sinter waited. With a jolt, my attention came back to the here and now. *Dragonfly* was ruinously damaged. And I, as a fledgling crew member, had succeeded at being a hero but failed at being an astrogator. I dreaded never going to the stars with *Dragonfly* again. Finally I forced the words out. "May I leave?"

"Only until we get *Dragonfly* repaired." He smiled. "Go in peace, my friend," Sinter said.

But I did not go alone. Sinter went with me. He took one rose, carefully holding its stem in his fingers. On our way out of *Dragonfly* we collected the cat. Then I helped him deactivate the ship. We turned off the communication net, the computer, the life-support systems, everything except the daylights. In the bright light of day, repair crews would assess the battle damage and start making plans to rebuild *Dragonfly*. ■

● No man is smart, except by comparison with others who know less; the smartest man who ever lived has reason to be ashamed of himself.

Edgar Watson Howe



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"Victor!"

"Yes, Martin?"

Martin Crofts came bounding out of his office with a piece of paper clenched in his hand. "What is this?" he demanded.

"From my perspective, it appears to be the note I left on your desk."

"Victor! For God's sake! You mean to tell me that a call came in from a client while I was out and you didn't tell me?"

I snaked a foot or so of tongue in the general direction of the note, using it as a pointer. "I did tell you. In writing, no less."

Martin clapped his hand to his forehead. "I have a moron for a partner."

He knelt down so as to be on my level. For Martin, that's a long trip. He is over six feet tall and, as I am more tastefully built—about three feet or so, he had to get all the way down on his knees. I've never gotten around to telling him how ridiculous he looks when he does that.

"Victor, let me explain the facts of life to you—"

"I know the facts of life, Martin. You and Irene demonstrated them quite thoroughly last Saturday night on the couch. I might also point out that your 'facts of life' don't happen to coincide with mine."

He took a slow, deep breath before speaking. He always does that when he's trying to regain his patience. "Listen. We haven't had a paying case in three weeks. My wallet is so empty it echoes. We need this case."

Imitating Martin's voice, which I can do perfectly since I speak using a tym-

panum instead of vocal chords, I intoned, "Victor, we must present a professional appearance to the public. A tightly run ship inspires confidence in our clientele. Private investigators are regarded as slightly seedy no matter how they try, so it is imperative that we make every effort to—"

A pained look on his face, Martin said, "All right, all right . . . but I didn't mean that you should get so all-fired professional that you don't bring a case to my attention when we're so damned close to being broke!"

"Well, if you're so worked up about taking the case, why don't you use the number I thoughtfully provided at the bottom of the note and call him back?"

The logic behind that being irrefutable, Martin had no recourse but to do as I suggested. He rose to his feet and stalked into his office, slamming the door behind him. I wasn't worried. Martin never stays mad for long.

Sure enough, he came back out of his office in a little over ten minutes with his eyes all aglow. Visions of dollar signs danced in his head.

"We're going to talk to Harold Shoemaker and find out more about the case." He inhaled deeply, puffing out his chest as he did so. "Ah, it feels good to be back in business!"

"We're already in business. At least the lettering on the door claims so."

He made another of his periodic futile attempts to wither me with the pure force of his contempt. "Hey, banana body, just because you can eat garbage doesn't mean that I can."

"That reminds me, I haven't eaten

since Sunday night. Can we stop by the dump on the way home tonight?"

He shuddered. "Victor, you'll be the death of me yet. Why can't you just eat unspoiled food like the rest of us?"

"*Bleech!* Tastes awful. It takes time for the true taste to become evident."

"But moldy tomatoes?"

I rolled my eye—the only one I have. "Stop. You're making me hungry."

He swallowed hard. "I swear I'll never get used to your eating habits, Victor." He leaned around the corner of his office door and snagged his raincoat with his fingertips. "Oh, and one more thing," he said.

"What's that?"

"On the way home tonight, you're riding in the trunk. Your breath always smells *horrible* after you've eaten."

I hung my tongue out the window to catch some of the rain as we drove to meet our client. Martin, for once in his life, was paying attention to his driving and didn't notice until I stretched it out to full length and began to use it as a third windshield wiper.

"Victor, what the hell are you doing?"

"I'm thirsty."

He moaned and slunk down in his seat. "Jeez, I hope no one I know sees me."

"You're just jealous."

"Jealous! What use would I have for a tongue as long as my arm?"

I answered obliquely—playing back a selected portion of his marathon session with Irene in high fidelity, complete with sound effects.

His face turned the color of beets. "That does it! The next time I have a date, you stay at the office!"

"Temper, temper. As I said, you're just jealous."

"Victor, you're disgusting, lewd, crude, immoral, amoral—"

"I can't be both immoral and amoral. Make up your mind."

He growled deep in his throat—a creditable imitation of a wild animal. "Sometimes I wish my uncle had never brought you back from wherever it was that he found you."

I sighed. This train of thought always reminds me of Wanne. I had been about to wed Wanne when Martin's uncle decided that I was an interesting-looking specimen of off-world fauna, and kidnapped me on the eve of the ceremony that would have joined Wanne and me as ortho and para for life—analogous to the human wedding vows. My race had never had any interest in astronomy, much less space travel, so I had no idea how to tell Martin which of the myriad worlds that the human race had visited was my home.

At any rate, Martin's uncle kept me for years as a pet. When he died of old age, my custody fell to Martin. We had an uneasy relationship at first—Martin had no use for an extraterrestrial who looked like a three foot tall, one-eyed leather banana. The turning point had come when I used my superior reasoning abilities to help him solve one of the first big cases that his fledgling private investigation service had landed. Each successive successful case had increased his respect for me until he regarded me almost as an equal . . . in intellect, if not in physical stature.

Yet, still, even after all these years, I dream of being reunited with Wanne. As the sole representative of my kind

among the teeming billions of Earth, I know the true meaning of the word loneliness. I would find it difficult to leave Martin—I have grown fond of his bumbling ways—but I miss the company of my own kind.

“Snap out of it, Victor. You’re moping again.”

“Yes, I’m afraid you’re right.”

I tried to position the seat belt more comfortably. I could ride prone on the seat, but then I wouldn’t be able to see where we were going. The alternative was to stand on the seat with the belt wrapped around me three or four times to stabilize my body.

If I were brave enough, I could ride without a seat belt. However, the way Martin drives, that would be tantamount to suicide.

I’m not certain that he knows the difference between driving a car and merely aiming it.

The house where Harold Shoemaker lived was in a very classy neighborhood populated mainly by the old money crowd. A circular brick driveway glistened with silver highlights in the rain as we drove up to the front door.

Ivy threaded its way over much of the stone walls, giving the place a medieval air. My imagination kept insisting that there were horses tethered just past the periphery of my vision. Obviously, I was going to have to cut out watching late night movies with Martin. It would not do for me to begin to identify too closely with human history.

Martin nonchalantly parked his antiquated collection of rust next to a spanking new, cream-colored Bentley as though he were slumming simply to let

his car be seen next to such a gross thing. He would be truly insufferable if he owned a decent automobile.

Martin leaned over to unravel me from the seat belt. I would have done so myself, but my arms were vestigial, barely able to pick a telephone handset. Naturally, I could use my tongue to do the job, but for some reason Martin is squeamish about soggy seat belts.

Once freed of my restraints, he started to pick me up under his arm. The rain chose that moment to give a demonstration of the art of downpour. “Just set me down on the driveway, Martin. I would like to get a quick shower.”

My legs are not vestigial, indeed they are quite powerful, but they resemble six-inch long elephant legs and it is difficult for me to keep up with a normal human walking pace. The solution to this is for Martin to carry me under his arm when we need to cover distance rapidly.

“Suit yourself. I’m going to run for it,” he said.

He plopped me down on the bricks, slammed the car door, and was gone, all in one smooth motion. I followed at a more leisurely pace, as befits one with more inborn dignity.

I waddled up to the front door just as it opened.

Disappointing. No butler.

The man revealed, as the door swung open, was in his late sixties. He wore a red silk bathrobe with subtle designs worked into the fabric. Obviously a bit vain, he combed the remaining hairs of his fringe over the top of his head in an attempt to hide the gleam of his baldness.

“Come in, come in,” he said. His



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voice was more resonant than I would have guessed from looking at him.

Martin and I followed him into a study that cost more than Martin's entire net worth. That didn't take into account the exquisite solid walnut furniture, the leather-bound books that lined the walls, the huge oriental rug. . . . The room had that indefinable something extra that exuded a comfortable warmth—as though the room had been lived in long enough to wear off all the sharp edges.

Martin was impressed. I could tell by the way that he sat gingerly in the chair he was offered—as though he might break a priceless heirloom. His voice, however, was controlled. "You are Harold Shoemaker."

The man nodded regally, the highlights on his pate flashing briefly. "That I am."

"What can we do for you, sir?"

Shoemaker made his way behind an enormous desk; it seemed to be only slightly smaller than Martin's car. As he moved, I noted something that I hadn't seen as we had followed him from the front door into the study.

Since I am an outsider to the human race, I am able to see things that humans either ignore or are unable to perceive. I am not a doctor, nor do I care to be, but there were distinct indications that Harold Shoemaker was in poor health. A slight unevenness to his gait, a supportive grasp on the corner of the desk when it would not normally be necessary, an almost undetectable—even with my sensitive ears—catch in his breath. I would have found it instructive to be able to smell his breath, but that was not a request I could make under the circumstances.

"You are not well," I said simply.

Martin started and stared at me, but held his tongue.

Shoemaker pursed his lips and regarded me closely for a moment before speaking. "I have heard about you. They say that you have a good mind." He paused. "Yes, it is as you say. I am not well. There are several things—a bad heart, diabetes, ulcers. . . . I am a walking medical textbook."

"I'm sure that Victor did not mean to be so rude as to intrude on your personal—" Martin said.

Shoemaker raised his hand. "Not at all, not at all. Quite to the point, as a matter of fact. I value honesty and directness in a man. I may also have to extend that statement to include men of other species. I begin to think that I made the right choice when I chose your agency."

Reassured by Shoemaker's words, Martin asked, "What can we do for you?"

"As you have surmised, I am wealthy. I built a chain of shoe stores that catered exclusively to the upscale segment of the market." He chuckled softly. "I am not unaware of the irony of that choice of merchandise in light of my name. At any rate, I sold the chain, but retained a percentage of voting stock. The chain was sold in turn to one of the large department store conglomerates. I accepted stock in their company as payment. A wise move, as it turned out, for their stock split just a year later. I sold the stock and reinvested in a start-up semiconductor company. I won't bore you with the details, but I have been very fortunate over the years as far as money goes. Now I find myself worth

an obscene amount. Therein lies the problem."

I put two and two million together and said, "Someone is after your money."

Martin gave me another hard glare, but his expression relaxed somewhat when Shoemaker laughed. "There were times when I would have given large sums of money to have someone as direct as you by my side. You would be amazed how difficult it is to hold people to the truth when the aroma of money is in the air. They will tell you what they think you want to hear instead of what you need to hear. It becomes quite distressing, I assure you.

"I believe that someone is trying to kill me. I have two sons who would divide my estate equally in the event of my death. It pains me to say it, but I think that it must be one of them. I am willing to grant the possibility that there are others who might wish to kill me to settle old scores—I'm afraid that it is not possible to amass a large sum of money without making enemies along the way. However, I will discount those, as it has been almost fifteen years since I have been active in the business world and surely they would have made an attempt before now."

Martin's eyebrow rose. "You retired completely?"

Shoemaker made a small shrug. "Alas, that is not entirely possible. Money is an addiction and I find myself unable to resist dabbling in stocks from time to time. My point is that I have not participated in anything that would cause ill feelings. Very tame, really."

"What happened that makes you feel

as though someone is trying to kill you?" I asked.

Shoemaker shrugged again. "Nothing that I could prove. If that were the case, I'd take my evidence to the police. Little things like a loose board on the steps at the back door. One day it was firm—the next morning I was taking food scraps out to the edge of the woods where some semi-tame raccoons visit from time to time. The board came completely off of the steps. Fortunately, I only turned my ankle. Another incident involved an old rusty scythe that hangs above the door to my shed. It belonged to my great-grandfather and has a certain amount of sentimental value. One afternoon it fell, narrowly missing me. I got up on a ladder and looked. The hooks that it normally rests upon appeared to have been filed part way through."

"So it's a pattern of things that look like accidents?" Martin asked.

"Exactly. With the possible exception of the hooks that held the scythe, there hasn't been anything that I could point to and tell the police that a clear attempt had been made on my life. There have been other things as well, some so subtle that I am not even sure that they were part of the pattern or whether they are the products of an old man's overactive imagination."

It took him only a short while to give us a very succinct picture of the situation. Martin made note of the names and addresses of the two sons, as they seemed to be the most likely suspects.

It was still raining when we left. Again, Martin ran to the car. I followed at a more sedate pace, drinking in the

hedonistic pleasure of rain drops caressing my skin.

Being late in the afternoon, Martin took me directly to the dump for supper rather than go back by the office. He hadn't been kidding about making me ride in the trunk on the way home.

At least he left the lid open.

The next morning was dreary by Martin's standards, although the weather suited me just fine. Rain fell heavily in fits and starts, pooling in the gutters and running off of roofs in cascades.

Martin has been trying unsuccessfully to get the management to assign him a better parking space than the one we have now, which is in the back of our office building. It is my opinion that they are not accommodating him because they would rather not have me, an extraterrestrial, in their office building. Some people are just that way.

I decided that I had had enough of a good thing when I saw the filthy water flooding down the narrow alley between the building where our office is located and the one next door. I allowed Martin to carry me inside.

It was a mistake. He jogged.

It would have taken little persuasion to convince me that my brain was being pulped by the vibration. The fact that he ran up the stairs to our second floor office added insult to injury.

The light on the answering machine was on. Martin flicked the light switch, then crossed to the desk and stabbed the button to rewind the tape. The machine stalled half way through the rewind sequence—like our office building, it was not of the first rank.

Martin banged it with his fist. It did

not help. He cursed at it quite fluently. It still did not work. He sighed, removed the cassette and took it into his office where he keeps several portable tape recorders for our investigations.

The voice that came out of the speaker was that of Pete Sims, our contact in the police department. "Victor, tell Martin that we found his name and business number on a note pad in a desk belonging to a man named Shoemaker. He's dead. It occurred to me that he might be a current client of yours. Give me a call in the morning if this is of interest to you."

The speaker burped out the distinctive click that means that the caller hung up. Martin sat stock still for almost five minutes before reaching out to turn off the tape machine. I did not interrupt the quiet.

"I wonder how they got him," he finally said, looking at me, but not seeing me.

"There's only one way to find out."

"Yeah, right." He reached for the phone and punched the number for the police station. I went back to my desk in the waiting room.

Only once before had I been to the police station, therefore I was still a novelty item as far as the folks in the front office were concerned. As we waited for Pete, they all crowded around to look me over. I find my role in these games amusing, so I did a few of the routine stunts, like singing a song and harmonizing with myself—again, a trivial feat for a being who speaks with a tympanum. When Pete appeared, Martin crooked his finger towards me. I

apologized to my audience and scuttled after Pete and Martin.

Pete's desk was no better than the last time I had seen it. Wrappers from half the fast food places in town were piled deep around various half-filled paper cups. Of all the humans I know, Pete comes the closest to eating food the way that I do. Sometimes I tease him about that when he calls to speak with Martin. He thinks it's funny.

Pete leaned back in his chair and scowled at Martin. "Why is it that I have this nasty feeling that you're going to complicate my life with some oddball tale about how someone was out to kill Shoemaker?"

"You must have consulted your Ouija board. We were at his house at four yesterday afternoon, just to learn that very tale from him."

"Great. That's all I need. Now you're going to turn a tidy, ordinary, natural causes death into something monstrous and convoluted. I was planning on taking a vacation next week. I won't be able to go if this turns ugly."

Martin shrugged. "It could still be ordinary. He told us he had several health problems. Something might have finally caught up with him."

Pete nodded. "One of these health problems wouldn't coincidentally happen to be his heart, would it?"

"Yeah."

"Good. Maybe I can go on my vacation after all." He turned sideways in his chair and hooked a leg over the arm. "We got a call at seven last night from one of his sons. I believe his name was Raymond. He found his father sprawled in the hallway. The word I got from the coroner was that it was a heart

attack. Hopefully, that means that I'll be there when the fish start biting next week."

"Well, possibly not," Martin said, and proceeded to outline what we had been told the day before about the attacks being of a subtle nature and probably difficult to prove.

Pete's face grew darker by the moment. "Damn you! It's a conspiracy to keep me from catching that rainbow trout that I've been after since June."

"Sorry, Pete. I just thought that you might want to know what he told us."

Sims growled, he snorted, he made faces, but finally he slapped his hand flat on the desk and faced his duty. "Damn you!" he repeated. "Wait here." He left the room.

I looked at Martin and said, "I gather that we are ruining his day."

Martin chuckled. "Look at it this way. We're keeping him from ruining some poor, innocent trout's day."

Pete was not gone long. As he eased his potbelly back into his seat he transfixed Martin with a glare. I was glad I wasn't the one getting the evil eye. "I hope you're wrong, but I relayed what you said upstairs. Now I'm assigned to the case for the duration and my vacation is kaput."

Pete and Martin agreed to stick together on the case. Pete was hoping that, with luck, our assistance would help him crack the putative murder more quickly. He was still hoping to go fishing.

Martin, for all his other faults, has always been punctilious about earning his money. The as yet uncashed check for the retainer fee was wearing on his conscience like a pebble in his shoe.

My position was the same as for any other case. It would be an interesting mental exercise.

We made an appointment to meet Raymond Shoemaker at seven that evening. Officially, it was Pete's visit, but he was willing to bend the rules and let us tag along.

Martin waited until we got outside to tuck me under his arm for the walk back to the car.

"A quick solution would earn Pete's undying gratitude, if not that of the trout," I pointed out as I watched the world go by. I felt like a dog riding in the back of a pickup truck—I got all the fun without having to do any of the work. I let my tongue loll out of my mouth, to complete the mental image.

Martin rolled his eyes. "A quick solution would earn my gratitude as well, aardvark tongue."

"Calling me names won't get you anywhere, monkey face."

"Whatever you say, elephant legs . . ."

As we went down the street trading good-natured insults, the people we passed stopped and stared. Even though there are representatives from almost thirty extraterrestrial species currently residing on Earth, I am the only one that is able to speak in a clear, unaccented voice. Most other species that attempt to emulate human speech end up adding spurious clicks or groans.

" . . . says who, pillow wart?" Martin demanded just as we got to the car.

"Pillow wart! Who are you calling 'pillow wart,' two eyes?"

Martin unlocked the door one-handed and stood me on the seat. "You, cyclops!"

I played descending minor scales on violins with an ominous bass line in the background.

Martin frowned as he cranked the car. "Where did you get that music?"

"I made it up."

I let him drive for a few minutes. "Martin?"

"Yes, Victor."

"What's a pillow wart?"

"I made it up."

I stuck my tongue in his ear. It tasted awful, but it was worth it to hear him scream.

Raymond Shoemaker was a younger version of his father; the kind of son that the expression "chip off the old block" was invented for. At thirty-nine, his medium brown hair was already beginning to thin on top. Like his father, he had adopted the trick of combing his hair across the top of his head to conceal it. The same twinkling eyes peered out into the dusk as the three of us mounted his front doorstep.

"You must be . . ." His eyes found me. "Ah, but of course you are. No one else has Victor for a partner."

Raymond's house was not as nicely appointed as his father's, but it had that same lived-in warmth. He escorted us to a living room that was only the size of a small barn.

Pete settled into an overstuffed armchair so deep it seemed that he would have trouble getting out of it. Martin sat on the sofa.

Raymond turned to me with an embarrassed expression. "Ah, I'm terribly sorry, but I don't know what I have that would be comfortable for you to sit on . . . or even whether you sit at all."

"I'm comfortable standing, thank you."

"I assume that you are here in connection with my father's death," he said to Pete.

"Yes, I'm afraid so. You see, there's a possibility that it wasn't entirely due to natural causes."

Raymond didn't flinch, didn't start, didn't react at all. A few seconds passed. Finally, he said, "I hope that you're wrong, but I am aware that my father believed that someone was trying to kill him."

Martin started to say something, but Raymond held up his hand. "He did not take me into his confidence. No doubt, I myself am one of the suspects. The way it happened was that I went to visit him just after he had had a close call with an old scythe that hung over the door to his shed. When I drove up, I saw him on a ladder, which alarmed me greatly, as his balance has never been good. Without thinking, he mentioned that it seemed as though the hooks had been filed through so that the vibration of opening the door beneath the scythe would be enough to cause it to fall. The deduction was obvious."

Pete sighed heavily. "Well, I hate to sound melodramatic, but can you tell us where you were yesterday?"

"Unfortunately, I was here at home. Alone. There is nothing that I can think of that will verify that."

Raymond was quite willing to answer any question that we put to him. Like his father, he lived alone, having been divorced some years before with no children. He had gone to visit his father as part of an informal program he had of checking in at random intervals due

to his father's poor health. Unfortunately, this time it had proved to be too late.

Pete and Martin questioned him quite closely about his visit, trying to find some small inconsistency that would allow them to explode his story. Other than the undeniable fact that he had been at his father's home, they were unable to find anything incriminating.

As we were leaving, Pete turned at the door and asked, "Could you tell us how to contact your brother? We haven't been able to find him."

Raymond swallowed heavily. "I have already spoken with him. He will be arriving on the 10:33 flight from Boston this evening."

Martin's eyebrow arched. "Boston?"

"Yes, Matthew is a doctor. He was attending a medical conference. He called just before I went over to Father's last night; so I know that he was at his hotel as of late yesterday afternoon as the call was routed through the hotel switchboard and I spoke briefly with the operator."

Pete nodded. "Well, if he was in Boston last night I don't suppose that he could have been here at the same time. I'd like to talk to him anyway, just to satisfy my superiors."

"Of course. I'll have him call you when he gets in."

Pete's car was better than Martin's. I was relegated to riding in the back seat, but did not mind as the upholstery was softer and felt better against my skin.

Martin and Pete discussed what Raymond had said in low tones as we drove through the wet streets. I said nothing, electing to descend into the trance state

that I use when I need to fit pieces of a recalcitrant logical puzzle together.

I'm not sure what human theorists would have to say on the matter, but I believe that my subconscious is somewhat closer to the surface than is the norm among humans. I attribute part of my success in helping Martin unravel his cases to this fact. Call it intuition if you wish, but when logic is stalled, I allow what Freud would no doubt have termed my Id to play with the facts. The results are almost as reliable as those I obtain by the more usual processes of inductive and deductive logic.

"Raymond didn't do it," I said.

Martin twisted around in the seat to look towards me, though his night vision is nowhere near as acute as mine. "What?"

"Victor, if I didn't know your track record, I'd say that you were crazy," Pete said. "How did you decide this?"

"Intuition."

Pete grumbled to himself for a moment before speaking up. "OK, wise guy, if Raymond is innocent then who did it?"

"The obvious corollary is that Matthew did it, but I would be hard pressed at this point to back that up with the necessary logic to convince a jury."

As we got out of his car, Pete said, "Victor, I'm counting on you. If you can save even part of my vacation, I'll give you half of my fish when I get back."

"Don't bother putting them on ice. I want them to be ready to eat."

Pete made a sour face, but faced the bargain squarely. "It'll be a waste of good trout, but you've got a deal."

"Now all I have to do is earn them," I told Martin as we strode up the walk.

Matthew was as unlike his father and brother as possible. Taller, with hair almost as dark as Martin's, and possessed of an athletic build, he had decided to become an endocrinologist rather than follow in the entrepreneurial vein.

His manner was different as well. The other two Shoemakers had struck me as being in control of their egos. They were wealthier than any ten average folk put together, but they didn't feel obliged to lord it over those with less endowed bank accounts. Matthew, however, was as arrogant as they come. His personality was composed of three parts ego to one part pride, with a strong dash of hostility thrown in for good measure. If there was a speck of humility anywhere in him, God himself wouldn't begin to know where to look for it.

His house had none of the graciousness of his father's. It was a modern affair that resembled nothing so much as a pile of oversized children's building blocks casually tossed into a convenient lot. The trees in the yard looked as though they had been planted as an afterthought. The overall effect was not aesthetically pleasing.

The inside was not much better. When his maid opened the door, I caught glimpses of masks in an African motif hung on the wall next to the classic Greek masks of comedy and tragedy. I was still trying to decipher whether that juxtaposition was supposed to mean anything as the maid showed us into the living room.

A single mask hung on the wall in

the living room. Having never seen one like it, I stood under it in order to get a closer look.

"Inuit," came a booming voice from behind me.

"Whatever it is, it's real," I said, turning.

Matthew Shoemaker's eyes narrowed. "Yes, of course it is. Why shouldn't it be?"

"No reason for it not to be. What I meant was that it smells old; it's not a replica."

He glared at me for a moment, giving me the uncomfortable impression that I had made an enemy without meaning to do so.

He spun on his heel with an abrupt motion. "All right. I agreed to see you because I must. Let's get this over with. I don't see that you have any right to come barging in on a man's grief when he's just lost his father."

Pete, I'm sure, has seen it all during his fourteen years on the police force. Martin, on the other hand, reacts poorly to the sort of attitude that Matthew was displaying.

"We were concerned that someone might have wanted your father dead," he said. The words were innocuous enough, but there was an edge to the way that Martin said them.

"Are you saying that my father was murdered? I was told that he had a heart attack!"

We could have left right then. The rest of the conversation was just repetitions of that first exchange with variations in wording and tone of voice. We stayed another thirty minutes, but it was a waste of time.

On the way out the door I paused

under the tragedy mask in the front hall. "Matthew, how many masks do you have?" I asked.

"I don't know. I can't say as it ever occurred to me to count them. Probably at least thirty or so. All genuine, of course."

"Of course. I wouldn't dream of suggesting otherwise." I turned from the mask to look directly at him, "Why do you collect them?"

My question seemed to catch him off guard. He hesitated for a moment before answering—which was quite unlike the rapid fire answers that he had rattled off to our earlier questions.

"It is my opinion that we all live behind masks. We show different faces to different people, but invariably we hide our true selves."

I decided to take a wild shot. "Which of the masks is your father?"

For a split second he was on the point of answering, but then his face closed and I knew that I had lost the gamble. "What makes you think that these masks have anything to do with my father?"

I cannot shrug as I have no shoulders. "Oh, nothing. Just a thought."

The atmosphere became quite chilly after that and we left quickly. Martin waited until the car had started before he asked, "What did you mean by that last little crack, Victor? Do you think he's hiding something?"

"I'm almost sure of it. He probably felt rejected by his father as a child. Actually, I could have asked which mask he identified with, himself, but I thought I stood a better chance asking about his father."

"For God's sake, Victor, the man was in Boston!" Pete protested.

"I know."

"Well?" Martin prompted.

"Can we go to Harold Shoemaker's house? I'd like to take a look around."

Pete nearly said no, but I knew that he would give in since it was the only way that he stood a chance of going fishing.

Martin just sighed and said, "Victor, the police have already been over the house. . . ."

"Martin."

"Yes, Victor?"

"We are operating on the assumption that Harold was murdered, correct?"

"Well, yes. I mean, it's a possibility that we should consider."

"We are actively asking questions that could be construed to mean that we are conducting a murder investigation. I take that to mean that we are more than casually considering the possibility that this was a murder and not just an ordinary death from natural causes."

"OK, since you put it that way, yes, we are investigating a murder," Martin admitted.

"Would it not be prudent to examine the scene of the alleged crime? We have two suspects who have a reasonable motive: money. I don't happen to think that Raymond would kill his father, so in my mind I have already narrowed it down to Matthew. The question now becomes how it was done, not who did it."

Pete looked distinctly unhappy. "Victor, that's hardly proper procedure. You can't just arbitrarily decide that a man is guilty."

"You've never acted on a hunch, Pete?"

He made two attempts to speak—both stillborn. "OK, Victor, you win. Your hunch is that Matthew killed his father. I must admit that I didn't like him either, but that doesn't help us. Raymond said that he spoke to his brother in Boston just before he left to go see his father. . . ."

My mind fragmented into a thousand sparkling pieces of broken glass. "*Pete!*"

He actually jumped. The car swerved. "What!"

"Call Raymond right now! We've got to ask him a question!"

Pete pulled into a shopping center a mile further down the road and located a telephone booth. I coached him on what to say and exactly how to phrase it before I let him make the call. I would have made the call myself, but the only practical way for me to reach high enough to grasp the telephone handset in a pay phone is with my tongue.

He came back to the car in just over two minutes, looking grim. "Yes," was all he said.

Martin turned and said worriedly, "I hope you know what you're doing."

Martin's way of going at things is to create elaborate scenarios where he can implicate any given person in the entire world. Sort of a Rube Goldberg approach. He then begins to eliminate the intermediate steps, thereby eliminating suspects as he goes. It works, but it takes him forever to get anywhere. I prefer to start with a much smaller pool of suspects—one, if at all possible. Occam's razor is my model. The simplest theory that will cover all the facts must be the correct one. Martin and I will,

given time, arrive at the same conclusion, but my way is quicker. The rapidity with which I arrive at conclusions makes Martin nervous. He is always afraid that I'll overlook something in my "hasty" deductive process.

The expression on Pete's face as he turned to speak to me could have broken granite. "I assume that you still want to go to Harold's house."

"You still want to go fishing, don't you?"

His face softened enough to let a grin slip through. "Beats murder all hollow."

"And killing fish isn't murder?"

Another grin, somewhat more natural looking. "Guilty as charged. I have a motive and weapon . . . meaning my fishing rod. All I lack is the opportunity, and I'm counting on you to provide that."

Once more I stood at the front door of Harold Shoemaker's house. Pete broke the yellow tape with black block letters that said POLICE DEPARTMENT, and unlocked the door with the key that had been left in the same kind of safety box around the door knob that real estate agents use.

The house felt still and preternaturally quiet. The warmth had left when Harold died and there was no more feeling left in the house than in a stage set for a play. Now the play had finished and the tragedy mask hung on the wall in Matthew's house.

I shook myself. This kind of morbid thinking wasn't going to get me anywhere. Both Martin and Pete were looking at me as though they expected me

to produce a miracle right there on the spot.

"Where was the body found?" I asked.

Pete turned and led us down a hallway. "His body was found about here."

"Which way had he been heading?"

Pete gestured the way we were going. "Towards his bedroom, we think."

"I turned and headed back the way Harold had come from. I passed a bathroom and a study before arriving in the kitchen. I went to the center of the kitchen and turned in a complete circle—the only way I have of looking around since I have no neck. Martin and Pete followed me in, but stood against the wall so as not to interfere.

"What we're looking for is something that could have been poisoned. That way Matthew could be safely out of town when Harold fixed the contaminated food for supper."

Pete coughed gently. "I hate to upset your apple cart, Victor, but the coroner looked for poison during the autopsy."

"Didn't find any, huh?"

He shook his head. "Nope. The coroner noted the contents of the stomach and had them tested twice, just to be sure."

"There's something here. We just don't know what to look for, yet."

I had them open all the cabinets and pull open all the drawers, but nothing struck them as being noteworthy.

"Victor, are you *sure* that you know what you're doing?" Martin pleaded.

"Is the food still in the refrigerator, or has it been tossed out?" I asked.

Martin shrugged and opened the door. The food was still there. Milk, apple

juice, a head of lettuce, cheese, bottles of insulin . . .

My imagination would not let go of the insulin. Every time I tried to look at something else, my eye kept returning of its own volition to the two small vials on the second shelf.

"It's the insulin," I said.

Martin looked at me as though I were crazy. "What? Shoemaker didn't die of insulin shock, he died of a heart attack."

"Be quiet. Let me think."

I pictured the scene in my mind. Shoemaker standing in front of the refrigerator, removing a bottle, rolling it between his palms to warm the fluid so that it would not sting when he injected it, filling the disposable syringe that came from the box conveniently placed beside the refrigerator. . . .

"Pete, stand at the refrigerator, go to the trash can and pretend to throw something away, then turn and walk down the hall to where Harold's body was found, but do it a little slower than you normally would since Harold was older than you are. Martin, time him with your watch."

They both stared at me momentarily, but did as I asked. Pete stopped at approximately the place where the body had been found and turned to look back to where Martin and I stood in the door to the kitchen. "OK, Victor, what's this all about?"

I looked up at Martin. "Well?"

"Well, what?"

"How long did that take Pete to get to where he is now?"

"Oh. Uh, a little over twenty seconds. Maybe twenty-three or four."

"Perfect," I replied.

"Victor, do I need to keep standing here?" Pete called.

"No, come on back."

I directed them to retrieve the bottles of insulin and the used plastic syringe, which was the top item in the trash can, and started for the front door as fast as my stumpy little legs would go.

"Hey, banana face, you want to clue us in on what happened here?" Martin shouted as he ran to catch up with me.

"Something I read a while back," I replied, stopping just inside the still open front door. I turned to Pete. "You are aware that I do not sleep. Since I need something to do during the time that Martin is asleep, I read."

Pete looked at me carefully. "Exactly what kind of stuff do you read?"

"Anything and everything."

"Oh. Right. That still doesn't tell me how Shoemaker was murdered."

Smiling does not come naturally to my race, but my equivalent body language doesn't register on humans. Therefore I have learned to do a passable imitation of a human smile. "He was scared to death," I said, and walked out into the afternoon rain.

No oversized mother had been by to pick up the jumbled blocks of Matthew's home during our absence. The same maid opened the door, becoming flustered when Pete flashed his badge at her. We had not called ahead to warn of our impending arrival.

"We'd like to see Matthew Shoemaker, please," Pete said in his most official voice.

"Uh, just a moment, sir. Let me see if he's here."

"We'll just wait in the living room,

if you don't mind," he said, shouldering his way past her into the hallway.

She fled, calling for Shoemaker at the top of her lungs. It did not take long for him to appear. Had he been a bull, he would have been snorting and pawing the ground.

"What's the meaning of this? You can't come barging in here like this, without so much as asking permission."

"Actually," Pete said in a surprisingly mild tone, "I can."

Matthew's face darkened. The bull was about to charge. "I think you had better explain yourself."

Pete nodded agreeably. "Certainly. Actually, I wanted to congratulate you on a nearly perfect murder. If it hadn't been for Victor; you would probably have gotten away with it."

Matthew glared at me. I resisted the temptation to hide behind Martin. "What? This . . . creature is accusing me of murder? Of murdering my own father?"

"Yes," I said, staring up at him. One eye against two.

"But I was in Boston! Would you care to explain to me how someone could commit murder at such a distance?"

"It was quite easy," I said. "Your father bought his insulin through you, didn't he?"

"Yes, of course. There was no reason for him to spend the full retail price when I could get it for him at whole-sale."

"Imagine that. A man with as much money as your father had, balking at the price of a bottle of insulin."

"There was no reason for him to spend—"

"So you offered to get his insulin for him."

"Well, yes, although I can't see that this is any of your business." Matthew's tone had changed subtly. He was on the defensive.

"And you, being an endocrinologist, would have access to other interesting compounds as well."

"What are you trying to say? I don't have all day to put up with your meandering talk, you know. As a matter of fact, I'm running late. I was supposed to pay my respects to my father at the funeral home—"

"There's an interesting chemical by the name of cholecystokinin tetrapeptide."

Matthew suddenly became very still and very quiet.

"It was first discovered in the upper intestine, but it also turns out to have dramatic effects on the human central nervous system. A small quantity, on the order of fifty to one hundred micrograms, will cause a panic attack."

Matthew started laughing, a horrible, strained sound. "I can't believe this. So it causes panic. You're saying that—"

"You knew that your father had a weak heart. Among other things that occur during a panic attack, the heart begins to race. For a man whose heart struggles with just the day-to-day load of walking, an increase in the heart rate, to say 130 beats per minute, would almost certainly be fatal. The beauty of your plan was that you could give him the bottle of insulin with the sure knowledge that you would be miles away before he made the fatal injection."

"But—" Matthew began.

"The syringe that your father used

last night, before his death, was found to contain trace quantities of cholecystokinin mixed with the insulin. After dredging up medical records of your father's insulin dosage this afternoon, it was determined that your father received nearly two hundred micrograms—more than enough to do the job, but still an amount small enough to be easily overlooked during the autopsy, especially since it is a chemical found in the body anyway."

"But—"

"The panic attack hits quite suddenly, twenty to thirty seconds after injection. I had Pete go through the motions of throwing away an imaginary used syringe and walking down the hallway where your father was found. Oddly enough, it took him a little over twenty seconds to get—"

"No—"

"Yes. You called your brother just about the time that your father would be taking his shot—after all, diabetics do need to be quite methodical about taking their shots—and suggested that he go over to check on your father."

"No—"

"I had Pete call Raymond. Raymond remembered that it had been you who had suggested that he pay your father a visit. Why? Were you hoping that your brother would get charged with the murder if anyone should begin to suspect that it wasn't due to natural causes?"

"It wasn't anything like that. I . . . I . . ." Matthew's eyes began to dart from me to Martin to Pete and back again, very quickly. He knew he had said too much. "Do you have any idea what it's like to grow up with a father like that? Everything always came so

easily to him. If he even thought about investing in a stock, its value began to rise. If he bought a company, it prospered overnight. It was so hard for me. I always had to work hard, very hard, to get the same results that he got just by lifting his little finger. I wanted to follow in his footsteps, but I knew I couldn't compete with him. I had to do something different. I became a doctor."

The words were pouring out now. He was trying to justify himself, but it wasn't working. The more he said, the worse he sounded.

"Surely, you didn't need the money," I said.

He gestured vaguely around us at the house. "You have no idea how much all this costs. If I was going to keep up with Father, I had to do it in a different area. I hired the top architects to design the house, the hottest interior decorators, the best of everything. It took everything I had. I owe huge sums of money."

"And you were going to use the inheritance to bail yourself out of bankruptcy."

He nodded slowly, all bluster gone now.

Pete stepped forward and snapped a pair of handcuffs on his wrists. "No matter what your motives were, he was still your father, and it's still murder."

Martin leaned back in the chair in his office. The familiar discordant screech of the springs underneath echoed from the walls. He smiled happily at the check in his hand.

"You know, Victor, I don't like murder cases . . . they depress me, but this

check makes the depression easier to bear."

"Raymond was kind to uphold the contract that we had with his father," I agreed.

A soft rapping sounded on the door jamb in the outer office. "Anybody home?" a voice called. Since that's my domain, I scurried out to stand by my desk and receive whatever visitors we had.

"Oh, it's you, Pete. Come on in to the inner sanctum."

Martin smirked up from his chair as Pete walked into his office. "So how was your vacation?"

Pete grinned and leaned against the door. He was tanned and looked a great deal more relaxed. "A little shorter than I would like, but I'm thankful to have gotten to take one at all. I just dropped by to thank you two for the help."

Martin shrugged. "No problem. We were glad to do it. You've done us favors in the past, maybe we'll need one again someday."

Pete looked down at me. "I didn't

forget your fish. They're out in the car. I just didn't think that folks would want me to bring them in, smelling the way they do."

"Sounds wonderful to me. I'm nearly hungry."

He glanced at Martin. "For you, I brought some that are somewhat, uh . . . fresher. They're in a foam chest with ice to keep them from turning into something that only Victor could tolerate."

"Did you catch that rainbow you were talking about?" Martin asked.

Pete shook his head sadly. "Nope, not this trip. But I caught an even bigger one in a pool a little further upstream, so it's OK."

"Sounds like a successful trip after all," Martin observed.

Pete nodded. "Yup, and it's all due to Victor and his late-night reading." He deepened his voice to imitate a well known news announcer. "Yes . . . once more, Victor is victorious over the forces of evil."

It's hard to be humble, but I try. ■

●For a thing to remain undone nothing more is needed than to think it done.

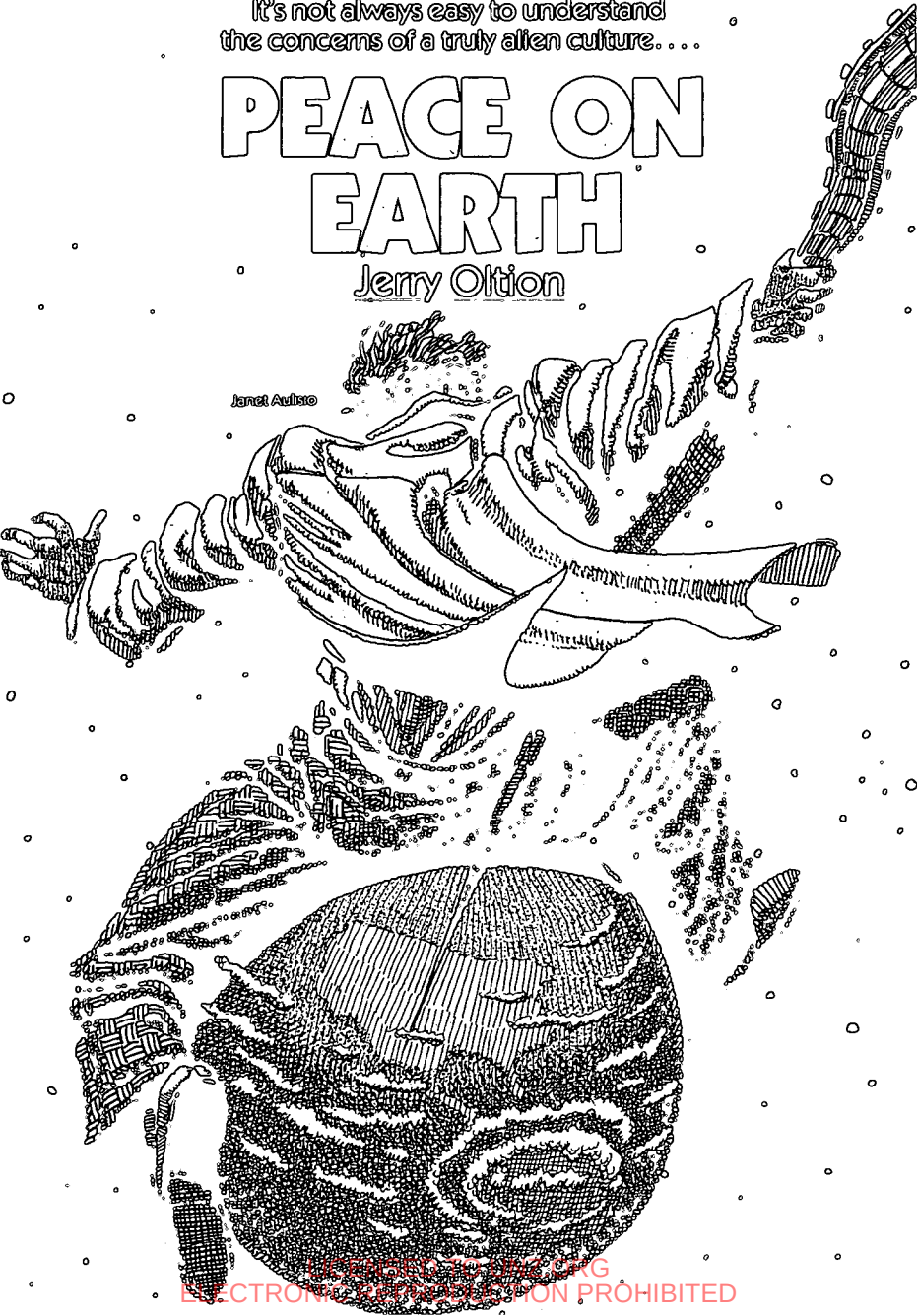
Gracian

It's not always easy to understand
the concerns of a truly alien culture....

PEACE ON EARTH

Jerry Olton

Janet Asling



UNREPRODUCIBLE IN ANY FORM
ELECTRONIC REPRODUCTION PROHIBITED

We were out at the mall—supposedly looking for last-minute Christmas presents but actually looking at girls—when Pinky said, “Hey, check out this old babe. She looks like a time traveler or something.”

We all glanced at him to see where he was looking, then followed his gaze to see a short, gray-haired woman in black leather and slashed pants. She stood by one of the mall’s central columns, just in front of the garbage cans, handing out some kind of pamphlet to anybody who’d take one. I could tell by her attitude she wasn’t just handing out advertising; she was protesting something. Probably the skystalk, I figured. All the old-timers are afraid the ground-to-orbit elevator cable’s gonna break and fall down right on *their* heads. Paranoid, every one of ’em. I wanted to go over and ask her just how she wanted to build the power satellites without a skystalk, but I didn’t.

Instead, I said to Ivan, “She’s just your type.” Ivan’s the worrier in our group. He’s always the designated driver, ’cause he can’t trust anybody else to stay straight at a party.

He looked at me like to say, “What?” He didn’t make the connection. Course he wouldn’t. Most of it was in my head.

Pinky saved me from having to explain. He guffawed and said, “I saw her first.”

Rachel gave him a shove. “Go make a pass, then.”

“Why don’t you?”

“Maybe I will.” Rachel could have, and probably succeeded, too. She’s good at it, but then she knows how girls think. We don’t mind—sometimes she

helps one of us out if we need it—but it pisses Pinky off when she goes after one he wants, cause he always loses.

She wasn’t into old punks, though. In fact, she wasn’t much into girls at all just then, and she said so. “Hey,” she said, “I’m tired of this; let’s watch a movie.”

“Which one?” Ivan asked, blowing a little bubble about a centimeter across with his gum, and snapping it.

“I don’t care,” Rachel said. “I just want to look at something flat for a while.”

“Huh,” Pinky said. He wasn’t going to touch that one.

Rachel didn’t wait for an answer, just walked off toward the theater without looking back. She knew we’d follow. We caught up to her at the catalog and packed around to read over her shoulder as she paged through the selections.

“Let’s see Batman Forty,” Pinky said.

“We’ve seen that,” Ivan said, blowing another bubble.

Not looking around, Rachel said, “I’m in the mood for something different.” She looked over at the old punker and grinned. “Something old.”

“Bat Forty’s old,” Pinky said. “It came out this summer.”

“Older. And funny.”

“Oh.”

She poked at the menu bars on the screen a few times and got a new page of titles: old comedies. She rapped on the glass a few more times and got a different list. *Really* old comedies. Stuff like Marx Brothers and Eddie Murphy and Sylvester Stallone. I scanned down

the title side of the screen and one jumped out at me.

"Dr. Strangelove," I said, pointing.

Rachel snorted. "Hah. Porno comedy from—God, from the sixties. Sure, what the hell." She rapped the screen next to the title, took out her cash card and stuck it in the turnstile slot, and pushed through. The rest of us poked our cash cards in the slot one at a time and followed her into the theater.

There was a four-seater already open, so we trooped right on in and dropped into the chairs and by the time I'd squirmed around and gotten comfortable the movie was starting.

It was in black and white. The sound was scratchy and the video was full of spots and stuff, and when the title screen came up we read the subtitle: *How I Learned to Stop Worrying and Love the Bomb*.

"We've been had," Ivan whispered. He was beside me on my right.

"Cheeze," Pinky said from beyond him. "People actually *watched* this stuff?"

Rachel, sitting to my left, said, "Yeah, and so am I, so shut up and let me do it."

So we watched the movie. It was about the crew of a plane carrying nuclear bombs and how this dumb mix-up made them fly into the Soviet Union with it. I had a bitch of a time making sense of it until Ivan said, "Oh, this was before we joined the States," but even then I didn't get half the jokes. The whole damn movie looked pretty grim to me.

It must have looked pretty grim to Rachel, too, because about halfway through, when the National Guard started

shooting up a military base, she reached over and grabbed my hand and squeezed. I looked over at her and I'm sure my eyes were big as dollars, but she just pulled my hand down on her side of the arm rest so Ivan and Pinky couldn't see and kept holding on. I wasn't going to argue, but I wondered what got her so scared. Then I started paying more attention to the movie and before I knew it I'd grabbed Ivan's hand, too, and he didn't even flinch.

This wasn't any comedy. Oh, sure, black comedy, but what it was making fun of was dead serious. It was making fun of the way people thought back then. The Soviets were the Big Enemy, or the US was, depending on where you were born. They had all these missiles aimed at each other, and bombers and submarines ready to deliver nuclear warheads to every major city in the world, and all of them were on a hair-trigger.

And people lived like that, knowing that any time, day or night, a cosmic ray could hit the wrong computer somewhere and blow them all to bits.

We were getting it second hand, but that was plenty. By the time the cowboy pilot went out the bomb bay with the nuke I thought I was going to throw up, and Ivan had swallowed his gum.

None of us got up until after the credits were all done and the lights came up again, and even then we didn't say anything, just got up and sort of shuffled for the door. As soon as he heard the familiar noise of the mall, Pinky headed for it like a shot, but Ivan and Rachel and I hung back, trying to work the horror off our faces before we ventured out into public again. Ivan looked back into

the empty room with its four seats and blank screen and whispered, "Jesus Christ." He shook his head, then turned away and followed after Pinky.

Rachel and I took a few deep breaths and went out after them. They were already halfway toward the main doors.

We passed by the old punker on our way out. She waved a pamphlet at me and I took it. Sure enough, she was

worried that the skystalk was going to come down. I just about launched into a defense of it, but I stopped myself, thinking, *She lived through what we just saw. No wonder she's afraid of things falling out of the sky.*

So I winked at her and said, "Merry Christmas," and waited until I was out of the mall to throw the pamphlet away. ■

IN TIMES TO COME

● Our Mid-December cover story, with art by Nicholas Jain-schigg, is Maya Kaathryn Bohnhoff's novelette "Shaman." It is, as the author calls it and the title may suggest, "an anthropological extravaganza"—but beyond that, she guesses the title inspires may lead you wildly astray. For now, suffice it to say that a first principle of negotiation with *any* group is that you must speak to them in language that they understand, and observe protocols that they consider important. Not all negotiators do those things equally well, of course, and therein lies a tale which is a lot of fun—and a little bit more.

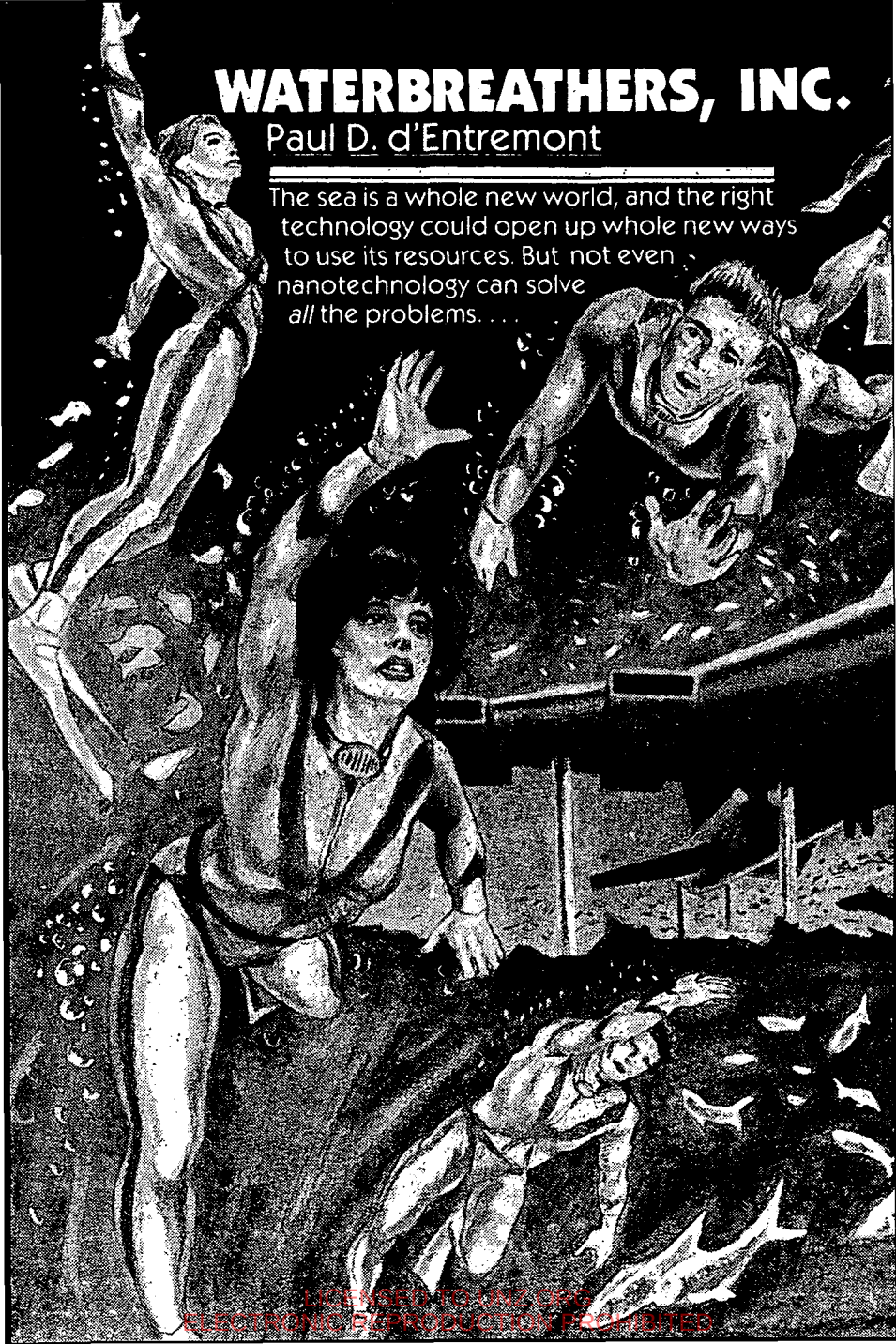
The fact article is "Taking the Shuttle to the Moon," a proposal by Chris Vuille, Ph.D., for adapting an existing technology to an imminent and somewhat daunting problem. The issue will also feature a goodly assortment of fiction, including an item by Doug Beason with the unlikely title "Ben Franklin's Laser," a little something for (at least approximately) the season, and assorted pieces by such writers as W.R. Thompson, Bob Buckley, and F. Alexander Brejcha.

Please note also that the Mid-December issue is when we'll be asking you to vote on your favorite stories, articles, and covers for the annual Analytical Laboratory. Feel free to start looking over back issues; come January, we'll help out with the annual index.

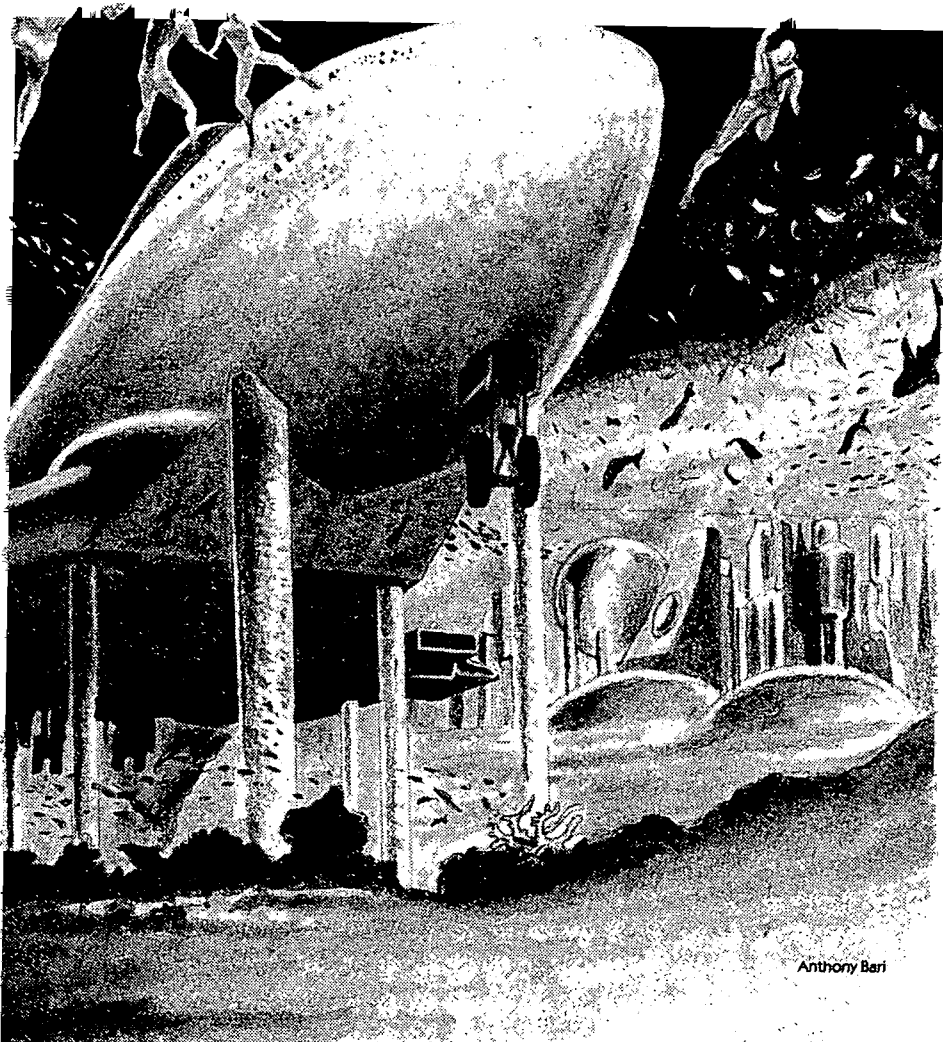
WATERBREATHERS, INC.

Paul D. d'Entremont

The sea is a whole new world, and the right technology could open up whole new ways to use its resources. But not even nanotechnology can solve *all* the problems. . . .



1
LICENSED TO ONE USER
ELECTRONIC REPRODUCTION PROHIBITED



Anthony Bari

At the southern edge of the Water-breathers colony, on the floor of the Gulf of Mexico, four yellow-suited divers examined a magnesium airframe. The airframe was supported by pillars of beige, artificial coral and was enclosed by a coral structure roofed with

a black, fine-weave fish net.

The airframe was the first of its kind, the frame for a supersonic cargo plane to be manufactured by Grumman. From a distance it looked solid, ready to fly, with a skin of shiny magnesium. But up close it resembled a metallic sponge,

with millions of tiny holes through which the water passed. The holes in the skin would eventually close, but the structure would remain hollow and spongy, like the bones of a bird.

Ginger Peterson, the chairman of the board of Waterbreathers, Inc., watched the divers apprehensively. For four months the airframe had grown according to plan, accreting its structure from the magnesium-rich seawater. But in the last twenty-four hours it had sprouted dozens of small protuberances like mosquito bites. The divers passed sensitive probes over the surface of each one, measuring its size and location.

Darrell, the tallest diver and the leader of the airframe project, clipped his probe to his tool belt and swam to Ginger. His face was tense, somber, not at all his normal demeanor.

"We need to shut off the nanoprocessors," he said. The words came from the bright blue Dorsephone at his neck.

Ginger felt a knot in her stomach. Shutting off the nanoprocessors was the last thing she wanted to do. "Do you know what's causing the bumps?"

Darrell shook his head. "I've never seen anything like it. The nanomachines are accreting randomly, completely ignoring the program. It's like cancer."

"Have you taken any cores?"

"Not yet. But I think we should shut off the nanoprocessors before we do, or those bumps will keep growing."

Ginger asked some more questions, thinking, stalling, watching the other divers, but failed to come up with a better course of action. "OK," she said finally. "But let's get them back on as soon as possible."

Ginger stayed for an hour, helping

the divers. They extracted tiny cores of magnesium from the protuberances and from unaffected spots on the airframe, carefully placing each core into a canister labeled with the time and location. Except for Darrell, the other divers seemed surprised to see the corporation chairman skillfully using a coring tool.

As Ginger cored into the protuberances, she kept thinking of how Darrell described them—"like cancer"—and it made her shiver. The airframe was the biggest project Waterbreathers had ever attempted. Darrell and his team had spent months working with Grumman on the design, and many more months testing and modifying the nanomachines that made it grow. Once the colony began producing airframes in quantity, the potential profits were enormous. The sea would supply the magnesium virtually free of charge.

And Grumman would pay a premium price. With a frame and skin constructed in one piece without joints or rivets, the airframe would produce an airplane that was extremely light, strong, and streamlined. But until the first airframe sold, the colony needed cash. Willard Jackson, the investment banker financing the project, was visiting next week. If he saw the airframe in this condition, it would mean disaster.

At the completion of the coring, Ginger swam with the divers as far as the laboratory and continued across the plaza. She entered the administration building, a squat coral building between the rusty legs of the abandoned oil platform that was the colony's only above-water structure. After climbing through the hatch, she exhaled the salt water from her lungs, beginning the transition

to breathing air. She felt tired and tense, still worried about the airframe.

She took several deep breaths from the basin of nutrient-rich water near the hatch. The water replenished the monolayer of nanomachines on the surface of her lungs and also rinsed away residual salt. As usual, it felt refreshing, like taking a shower after a sweaty jog.

Now came the uncomfortable part of the procedure. Ginger bent at the waist until her face almost touched her knees and expelled the water. She coughed several times to drive it out. The monolayer was hydrophobic to shed water quickly, but until it had drained, her lungs were essentially useless, and she felt suffocated. She breathed quickly and deeply until her lungs operated properly.

She toweled dry and walked to her office, then made a short phone call to Grumman—a call she hated to make. She had promised to keep them informed of any significant developments on the airframe.

The next morning, Ginger changed into swimming gear early, intending to visit Darrell. But as she was walking out the door, the phone buzzed.

It was Roger Maytree, the chairman of Zychotech. Six months earlier Zychotech had made a bid to purchase Waterbreathers, a bid that Ginger had successfully thwarted. Her heart beat a little faster when she saw his face on the screen. He wore a dark gray pin-stripe suit, his black hair perfectly combed.

"Roger, I thought we'd gotten rid of you," Ginger said with a scowl.

Maytree laughed. "Good morning,

Ginger. It's good to see you, too." Maytree was a smooth talker—too smooth, Ginger had always thought. "Look, I'm just making a heads-up phone call to let you know that Zychotech plans to make another offer for Waterbreathers. We're sweetening the offer considerably this time."

Ginger sighed inwardly. Not again, she thought. "As I told you before, Waterbreathers isn't for sale."

"Don't be so stubborn, Ginger. I hear you're stretched pretty thin by your deal with Grumman."

"Oh? And where did you get that idea?" she said as nonchalantly as she could manage. The fact that Waterbreathers had a contract with Grumman wasn't a well-kept secret. But she had gone to great pains to keep the colony's financial situation quiet.

"The nanotechnology business isn't that big," he said. "Word gets around."

Ginger looked at him sharply. Was he just bluffing, she wondered, or had he really heard something?

"Don't believe everything you hear," she said. "And if you think this is a good time to take advantage of us, you're wrong."

Maytree smiled briefly. "Ginger, I couldn't take advantage of you if I wanted to. But I do want you to know that I'm determined to buy Waterbreathers. I'll do it either with your help or without it, but it would be much easier if you helped me. I plan to keep you in charge of the colony, and I'll pay you a good salary." He smiled again. "At least promise me you'll think about it."

Ginger could see no point in discussing the matter further. "I assume we'll get a more formal offer than just this

phone call.”

Maytree nodded. “Within the next week our board should work out the details. We’ll send a letter to you and everyone on the Waterbreathers board.”

After saying good-bye, Ginger swam to the laboratory thinking about the conversation. She liked the idea of having someone pay the bills—as long as it was someone other than Maytree. It wasn’t that she disliked him; after the takeover bid they had parted on friendly terms. But something about the man bothered her. She had felt it all through the previous negotiations, and she felt it even more today.

At the laboratory, Darrell and his assistant Andrea were working at the console of a Rawlston disassembler, examining the cores taken the previous day. They both looked tired, as if they hadn’t slept all night.

When Darrell saw Ginger, however, he smiled broadly. “You’re just the person I need to see,” he said. “We need to schedule a little overtime.”

“Just make sure you keep it *very* little,” she said.

Darrell laughed. “We’ve examined most of the cores. Those bumps are caused by foreign machines,” he said. “Fortunately, they’re only on the surface. . . . Here, let me show you.” Darrell pointed to the disassembler screen and began explaining about the machine.

The foreign machine had a feeding module and a replication module similar to those of the airframe machine. But the communication module was simple, lacking the ability to interpret sophisticated instructions from the nanoprocessors. The trademark module indicated

the machine had been designed by McNorrill Industries.

Foreign nanomachines were the bane of underwater manufacturing. There were now ten nanotechnology firms operating in the Gulf of Mexico—five started in the last year—and each used nanomachines by the billions. By design, the machines usually stayed within their structures, but a few strays were inevitable. Most of the strays deteriorated in open water, but if one attached itself to an accreting structure with a nanoprocessor, it would activate and wreak havoc. The nanomachines in the airframe included several specifically designed to identify and repel foreign nanomachines.

“Judging from your smile, I’d say you know how to get rid of them,” Ginger said.

“Oh, sure. We just take a grinder to each bump and grind it off.”

“Won’t they grow back?”

“I don’t think so. Actually, I don’t understand why they stuck in the first place. They should have been repelled.”

“How long will it take to do it?”

“That depends on how much overtime you’re willing to authorize. If we work three technicians around the clock, we could have the airframe accreting again by tomorrow evening.”

Ginger winced. “That’s a lot of overtime.”

“If it makes any difference, the guys are willing to work it without pay.”

Ginger scowled.

“It was completely their idea,” said Darrell, defensively. “Besides, you want the thing fixed fast, don’t you?”

“I do, Darrell, but if we’re going to

work people overtime we're going to pay them. The situation's not *that* bad."

"I hoped you'd say that," said Darrell. "So, can we go ahead?"

"Do I have any other options?"

"Sure. I could design a counter-machine to reject those bumps. But I doubt I could have it ready by tomorrow." Darrell watched her expectantly.

"Go ahead," she said after a few seconds of thought. Then she added, "And I want you to get some sleep. OK?"

"Yes, ma'am." He saluted her sharply.

Removing the protuberances required two days of steady grinding, a day more than Darrell had projected. Several times Ginger considered calling off the overtime and insisting it be done on a normal schedule, but she wanted it finished well ahead of Jackson's visit.

When Darrell turned on the nanoprocessors, several more bumps appeared. New bumps continued to appear for the rest of the week, growing less numerous each day. Technicians scanned the surface twice per day, immediately grinding any bumps that appeared. Thankfully, there were no further surprises.

The week before Jackson's visit was an especially busy one for Ginger. In addition to her normal administrative duties, she chaired a board meeting in Houston, negotiated a new contract, and prepared two quotes for customers who wanted magnesium aircraft wheels. She also made time to attend the weekly social hour in the colony's recreation hall. As chairman of the colony, she felt it important to stay visible and accessible.

But, even with the heavy schedule,

the airframe was never far from her mind. The fact that the bumps kept reappearing bothered her; it was like a cancer in partial remission that might erupt at any moment. Darrell gave her a report daily, and each afternoon she swam to the airframe to inspect it. The trips calmed her anxiety.

The trips also reminded her how much she enjoyed swimming, something she had neglected recently. Ginger was a large, athletic woman with a tendency toward fat, and on land she often felt self-conscious about her size. But she was a strong swimmer, agile and graceful in the water. When she had learned to waterbreathe two years ago, it had been a dream come true. Freed from the need to surface or worry about scuba gear, she could swim with the fish and feel like one of them. It was one of the reasons she had decided to come to Waterbreathers.

Another thing she enjoyed about the daily swims was that they gave her a chance to watch the kids in the playground. Ginger had always encouraged employees to bring their families on a limited basis, but in the last month she had allowed several couples to bring their children for summer vacation. Two machine designers had developed a coral-building nanomachine that constructed playground equipment. The playground, now half grown, had an underwater fort with several "secret" entrances, a coral whale, and a 20-meter cube filled with huge coral tubes that the kids could swim through. The kids learned waterbreathing easily and took to the playground with enthusiasm.

Ginger's daily swims to the airframe took her past the playground. It quickly

became the highlight of her trip. One afternoon, after a particularly trying morning, she joined the two Weatherbee boys in a game of water tag. She chased the astonished youngsters at top speed through the coral tubes, catching each of them several times.

Ginger made a resolution to keep up the daily swims. They gave her a chance to forget about financing, to forget about Zychotech, and to remember what she loved about living at Waterbreathers.

On the morning of Jackson's visit, Ginger dressed in her best business suit and met Jackson at the helicopter pad atop the oil platform. They rode the elevator down to the conference room in the administration building, where she briefed him on the additional funding needed for the airframe project.

Her stomach was full of butterflies as she spoke. Jackson listened intently, asking questions frequently. He was a short, balding black man with an impassive face. "Your request seems reasonable," he said, "but you've increased your projections several times in the last year, and so the board will have to take a careful look at it."

Darrell reported on the airframe project, explaining about the foreign nanomachine. Jackson asked a number of questions and seemed pleased with the answers. The butterflies in Ginger's stomach began to subside.

After the meeting, they toured the colony. Ginger started the tour by circling the plaza, a 100-meter square of artificial coral surrounded by the coral buildings that formed the nucleus of the colony. She pointed out the structures that had been grown since Jackson's last

visit.

Next on the tour were the production pens that encircled the plaza. Ginger briefly went by the older pens, many of which he had seen before. Some of them produced magnesium ingots, which the colony sold as raw materials. Others produced small, custom-made magnesium products. The tour was going well.

But when they entered the airframe pen, Ginger immediately knew something was wrong. Darrell and three other project leaders, who had entered a few minutes earlier, were examining the airframe with tense expressions. The airframe looked different, lacking its normal luster.

Then Ginger recognized why, and her stomach tightly knotted. Magnesium bristles covered the airframe like a two-day growth of beard.

"Shit," she said, then remembered that Jackson was swimming beside her.

"I assume it doesn't usually have those filaments," said Jackson. His tone was matter-of-fact.

"Uh . . . no," she stammered, her Dorsetphone squeaking as her throat tightened. Her mind raced, trying to come up with something to say that would salvage the situation. Darrell swam towards her with a grim expression.

"Do you have these foreign machines often?" asked Jackson.

"Not any more," said Ginger emphatically. "We had quite a few when we started out. But we've developed counter machines that can repel most of them."

"I see." Jackson swam to the airframe and began inspecting it, starting

with the closest wing.

"I'm sorry, Ginger," said Darrell. "I should have posted someone here. At least you would have been forewarned."

"Don't worry about it. It's not your fault."

"If only I had known those things could grow so *fast*." He shook his head. "The airframe was completely clean this morning. I checked it myself."

"Forget it, Darrell. Just figure out something to say to Jackson that won't make us look like complete fools."

Darrell nodded glumly. "Right."

Jackson completed his inspection and came back to Darrell and Ginger. "Isn't most of the airframe hollow?" he asked.

"That's right," said Ginger.

"Are the filaments growing inside the structure?"

"We don't know," said Darrell. "As soon as you leave, we'll scan it and find out."

"But what if they're inside the structure?" said Jackson. "Can you control them?"

Ginger mentally cursed. Jackson had zeroed in on her greatest fear.

"Oh, sure," said Darrell confidently.

"We'd just design a countermachine."

"I see," said Jackson, in a tone of voice that suggested he wasn't convinced at all.

Ginger wished she felt as confident as Darrell sounded. Constructing a countermachine for a machine you didn't design was an undertaking that depended largely on luck.

The rest of Jackson's visit was cordial but strained. At the helicopter pad, Jackson thanked Ginger for the visit but made no commitment on the loan. "I'll

have to discuss it with the board," was all he said.

As Ginger watched the helicopter disappear into the distance, she wanted to break down and cry. She felt embarrassed, defeated, with no will to go on.

Darrell took samples of the bristles and began analyzing them. Ginger helped the rest of his crew scan the airframe, working well into the evening. The scans showed that a small number of bristles had invaded the interior. The damage wasn't widespread, but it meant that a countermachine would be needed.

After completing the scans, Ginger visited Darrell in the laboratory. She found him hunched over the screen of the disassembler, arms folded.

"Doesn't look good," he said. "This machine has seventeen different modules, only four of which I recognize—feeding, replication, accretion, and communication." He pointed to each on the screen. "The other thirteen don't match anything in the literature. And there's no trademark module at all, so I don't even know who to call."

"What are the chances of developing a countermachine?"

"It's hard to say until I know more about those modules."

After her conversation with Darrell, Ginger swam to her office and made a depressing phone call to Grumman.

The next morning, after a fitful night's sleep, Ginger received the letter that Maytree had promised. She read it carefully. Zychotech's offer was generous, more so than she had expected.

She stared at the letter a long time. It was the perfect way to recover from

yesterday's fiasco. But she knew she couldn't do it. Waterbreathers was small and struggling, but she loved it. It was a community, a family, a home, and becoming more so all the time, especially with the children. A large corporation just wouldn't feel like that.

And the timing of the letter, one day after the appearance of the second foreign machine, made her highly suspicious. Maytree had made his phone call one day after the appearance of the first machine. The timing was too coincidental. Maytree was somehow getting inside information. Was there a spy at Waterbreathers?

She phoned each member of the board of directors and the corporation lawyer. Then she composed a letter to Maytree. She thanked him for the offer and promised to respond in three weeks, after the next board meeting. She was stalling, but considering the colony's present difficulties, that was the best she could do. It wouldn't be fair to the stockholders to say no when the colony was close to bankruptcy.

For the next two days Ginger caught up on business that had been neglected while preparing for Jackson's visit. Darrell and his team worked around the clock analyzing the unknown modules and trying to design a counter-machine. They constructed three prototypes, each of which failed miserably.

On the evening of the second day, Ginger put in a brief appearance at the colony social hour. The news about the airframe had spread, and the mood in the recreation hall was subdued. Ginger caught sight of Darrell at the hors d'oeuvres table, piling cheese on a

cracker and talking animatedly to his wife, Barbara. It was his first break in two days, Ginger knew, and she resolved not to disturb him.

However, he walked across the hall to talk to her. "We just analyzed two more of the modules on that machine. They're variants on an old Callagan accretion module," he said.

"Why would a machine have three accretion modules?"

Darrell took a bite of his cracker and shrugged. "It's a crazy machine. Even the modules themselves are tough to analyze. Andrea had to take those two accretion modules apart by hand. They fall apart when the disassembler tries to do it on automatic."

"I didn't know Andrea could do that," said Ginger.

"I didn't either. But in her previous job, Andrea worked under contract for Zychotech. Apparently, your old friend Roger Maytree has some pretty sophisticated techniques for disassembling machines."

"Hmmm. So she worked for Maytree," said Ginger, surprised. She explained to Darrell about her suspicions that someone was leaking information.

Darrell shook his head. "Not Andrea. Not a chance."

"Well, just for my benefit, keep an eye on her. OK?"

"Ginger, it's a waste of time, I assure you. But I'll do it."

On the morning of the fourth day after Jackson's visit, he called. He asked about the progress in eliminating the bristles, and Ginger explained in detail, trying to sound as positive as possible.

"The board has decided to make the

loan contingent on Waterbreathers eliminating the filaments," he told her. "They are afraid that funding you further under these circumstances might be throwing good money after bad." He was apologetic but firm. "When you eliminate them, let me know, and I'll come down again for an inspection. I'm sorry, but it's the best I can do."

When she punched the disconnect, she felt numb. Without the additional money, Waterbreathers had enough funds to operate for only a few weeks, a month at the most.

The day after Jackson's call, Ginger called a "town meeting," a meeting of everyone in the colony—workers, spouses, and children. She dreaded having to tell them, but it was better than letting rumors run rampant. She spoke to a recreation hall of long faces.

After the meeting, Darrell invited Ginger to his apartment, where the two of them and Barbara commiserated over a huge bottle of Rhine wine. Ginger hadn't gotten drunk in years, but at the time it felt like the right thing to do.

Ginger awoke with a splitting headache. She took some painkiller, and by 9:00, when she stumbled into her office, the headache was gone, although her body still felt full of lead. She sipped a cup of coffee and thumbed through the day's appointments.

At 9:15, the phone buzzed. She shook her head as Roger Maytree appeared on the screen. She found it sadly amusing to see him. "I'm having a bad day, Roger. Why don't you bother someone else?" she said.

Maytree smiled politely. "I'm just trying to help. I heard that the financing

fell through on your airframe project."

"You seem to know an awful lot about us," said Ginger with a scowl. The timing of this phone call, the morning after the town meeting, further confirmed her suspicions.

"Did you get my letter?"

Ginger nodded. "We got it."

"Then you know that Zychotech is making a very generous offer. You'd be a fool not to accept it."

"I sent you a letter," she said. "The board meets in three weeks. We'll give you an answer after that."

Maytree cleared his throat and stared at her, speaking in a low voice. "You're stalling, Ginger. So far, I've been nice about this. But I'm warning you, if you insist on standing in my way, I'll go straight to the stockholders. Why don't you be sensible about this thing?"

"We'll let you know after the next board meeting," she said curtly.

Maytree scowled. "OK, Ginger, have it your way." The screen went blank.

She stared at the screen with a mixture of rage and depression. Maytree was going to win—she could feel it. There was no way she could get further funding as long as the airframe was in trouble. And even if they succeeded in getting the loan from Jackson, Maytree could still appeal to stockholders and have a good chance of winning. He was playing dirty pool, and she knew it, but there was no way she could stop him.

Or could she? she suddenly wondered. The airframe had been beset by two foreign nanomachines in two weeks, an amazing coincidence. *And the second machine could be disassembled only by a method developed by Maytree.* The thought struck her like a thunderclap.

Ginger told her secretary to cancel the morning's appointments. She clipped her probe to her toolbelt and swam to the airframe pen. It was probably a wild goose chase, but she had to try.

An hour and a half later she walked into the laboratory with a triumphant smile. In her hand she held a yellow plastic cylinder about the size of a lip-stick container—a disposable cartridge for a nanomachine injection gun, of a brand not used at Waterbreathers.

"Where'd you get that?" said Darrell. He eyed the cartridge suspiciously.

"About five meters from the door of the airframe pen. It was buried in the sediment, with just the tip peeking out."

Darrell looked at the cartridge again, then his eyes opened wide. "The airframe was sabotaged!" he said.

Ginger nodded and explained how she had deduced it.

Darrell congratulated her profusely. "You know what this means, don't you?" he said excitedly, pointing to the disassembler screen. "It means that Maytree has a counter machine for that baby!"

The deduction was so obvious, Ginger couldn't believe she had missed it. "My word, you're right!" she said.

"What were you planning to do with the cartridge?"

"I don't know exactly," said Ginger. "When I found it, my first thought was to turn it over to the police. But now, I don't know." The thrill of finding the cartridge was beginning to fade, to be replaced by the grim realization that the airframe was still in trouble and they were no closer to fixing it.

Darrell folded his arms and leaned

back in his chair. "If we went to the police we'd be tied up in court for months. We can't afford that. We need that counter machine *right now*."

"Here's an idea," said Ginger. "What if we call up Maytree and tell him we found the cartridge. Then we threaten to turn it over to the police unless he gives us the counter machine."

Darrell pursed his lips. "You're on the right track, but I don't think he'd scare that easily. After all, a dropped cartridge doesn't prove much."

"But it's got to be Maytree," she protested. "His timing is too good."

Darrell smiled. "Only circumstantial evidence. And you need an awful lot of it to convince a jury."

Ginger sighed. "OK. But the cartridge is worth *something*."

"It's worth a hell of a lot, yes. And it's the best news I've heard since Jackson's visit. But it's useful only because of what we can do with it."

"What do you mean?"

"I'm not sure. I just have this feeling that there ought to be something we can do with it. . . . Maybe we should call Jack." Jack Henderson was the corporation's lawyer. His insight into Maytree's motives had been a key factor in fighting Zychotech's first bid. They placed the call in Darrell's office.

But as soon as the phone began to buzz, Ginger broke the connection.

"What's the matter?" said Darrell.

"The phone lines," said Ginger in a whisper, "they're not secure." The Waterbreathers oil platform was linked to the mainland by a line-of-sight microwave link. The beam was tight but not difficult for someone to intercept.

"I wonder if Maytree—" she began

to say.

"That's got to be it!" Darrell interrupted.

She looked at Darrell, only to discover he was looking back at her with a startled expression.

"Are you thinking what I'm thinking?" said Darrell, smiling broadly.

"I think I am."

Ginger and Darrell discussed the idea for an hour, developing it into a workable plan. The plan was to call Jackson and tell him they had eliminated the bristles. If Maytree eavesdropped on the conversation, as they assumed he would, he would probably send another saboteur. But this time, Waterbreathers would be ready.

The plan made Ginger uneasy. She was a corporation chairman, not a spy. It bothered her to develop a plan that relied on deception, as if she had sunk to Maytree's level. But it seemed like the only thing to do. And she felt good to be planning something, not just reacting to disaster.

She called in two other project leaders, each of whom critiqued the plan and suggested improvements. The four of them worked through lunch and into the afternoon, discussing what could go wrong and developing a contingency plan for each possibility. At three o'clock, Ginger said, "OK, let's do it."

An hour later, Ginger swam to her office and placed a call to Willard Jackson. She explained that Darrell had had a breakthrough. "The airframe should be completely clear by tomorrow," she said, her heart pounding. She found it terribly hard to stare at Jackson and tell him a bald-faced lie. If she had been

talking to him in person she couldn't have gone through with it. "When's the earliest you could come?"

Jackson checked his calendar. "How about the day after tomorrow?" he said.

"Great," said Ginger, and they made the arrangements. As she punched the disconnect, her fingers trembled.

The night before Jackson's visit, Ginger and Darrell slept on cots in Ginger's office. They wore black swimming gear. At 2:30 A.M., the intercom buzzed, awakening them. "Everyone's ready," said Richard, the guard directing the operation from the oil platform.

As Ginger and Darrell swam toward the airframe pen, they saw the outline of a boat's hull gliding silently at the water's surface. They hid behind the coral wall of one of the ingot pens, about 200 meters from the airframe.

The boat stopped directly over the airframe pen. A black figure splashed into the water. The figure held a flashlight, whose beam played through the water, occasionally catching air bubbles as it descended. The diver approached the airframe pen hesitantly, moving the light across it several times. A few times he was silhouetted against the wall, and Ginger could see the outline of scuba tanks, mask, and fins. He also carried a large pouch at his side. Finally, he swam to the door, opened it, and went inside.

And then, with no warning, floodlights illuminated the pen and the area around it. Two video cameras inside the pen focused on the diver. At the same time, a searchlight on the oil platform found the boat, and a cameraman with a telephoto lens began snapping close-

up pictures.

The door of the pen flew open and the diver swam out at top speed. He stared for a moment at the lights, then broke toward the surface in panic. Darrell started laughing. The plan was working perfectly.

However, before the diver reached the surface, the boat's engines roared to life. The boat sped away, leaving the diver behind.

"Oh, no!" said Ginger, staring at the diver in horror. No one had anticipated that the diver might be stranded.

By the time that Darrell and Ginger reached the diver, he was surrounded by a team of five men armed with spear guns—the sentries who had spotted the boat and who had tripped the intercom, the lights, and the video camera.

The diver was unarmed and terrified. He willingly handed over a nanomachine injection gun and a pouch with fifteen cartridges. Ginger asked him a few questions, but he could only signal in reply because he had no communications device. The sentries escorted him to the administration building.

Darrell and Ginger interrogated him. He was extremely cooperative, answering all their questions. Unfortunately, he was a hired hand, paid in cash, and didn't know the names of anyone on the boat, or who they worked for. He begged them not to call the police.

Ginger and Darrell met with the other project leaders in her office for a 3:30 A.M. session. "We hadn't planned on catching him," she said, "but now that we have him, we have to decide what to do with him." The group discussed the possibilities for an hour. They decided it was time for another bluff.

* * *

"Good morning, Roger," said Ginger. Maytree's face filled the screen. He wore pajamas, his face still groggy from sleep.

"Ginger!" he shouted when he recognized her. "Woman, do you know what time it is?"

"Don't pop a cork, Roger. It's bad for your blood pressure." Ginger made her voice as hard and cutting as she could. The key to maintaining this bluff was to hit Maytree really hard, to shake him up before he had a chance to think about it. "I just wanted to tell you that we've got your diver."

Maytree glared at her, tight-lipped. "I don't know what you're talking about," he said slowly.

"Oh, but I think you do. His name's Michael Parker, a drifter from Houston who dropped in on us with a nanomachine gun and fifteen cartridges. At first he claimed he didn't know who hired him, but when we asked him the right way"—she paused—"he said he was working for Zychotech."

"That's ridiculous!"

"We also scraped some nanomachines off his flippers. Must have gotten them from the boat that brought him here. We found twelve different machines, all manufactured by Zychotech."

There was a long pause. Ginger forced herself to stay quiet until Maytree had responded.

"I find that hard to believe," Maytree said.

"Tell you what, Maytree. I'm going to hold Parker for twenty-four hours. Within that time I expect you to send us two counter machines, one for each

of those machines. If I don't get them I'll turn Parker over to the police. I'll also turn over videotapes of our last two phone conversations."

"How do you expect me to develop countermachines for something I know nothing about?"

"Roger, that won't do," she chided. "You know, I'd hate to see you end up in jail over this thing. I just want to get my airframe fixed. Remember, you have twenty-four hours." She punched the disconnect.

As soon as Maytree's image faded from the screen, her energy faded also. Things had happened so fast over the last two hours that she had been working on adrenalin. But now, all she could do was wait.

Darrell walked into the room holding two cups of coffee. "You were great!" he said. He handed her a cup.

"Thanks. . . . Then why do I feel like hell?"

"You're worried."

Ginger sipped the coffee slowly. "I wish I could just be an ordinary chairman again. This industrial espionage stuff is tough on the stomach."

"Just a little longer."

Ginger considered sleeping but decided it was hopeless to try. She used the early-morning time to catch up on mail, which had accumulated to quite a pile. Later in the morning, she took her daily swim to the airframe.

Maytree called at 10:30 A.M. He wore a rumpled shirt with no tie or jacket.

"I just wanted you to know that I'm sending my best man to Waterbreathers," he said.

"Does he have the counter machines?"

Maytree nodded glumly. "He should get there early this afternoon. He has instructions to stay as long as you want. If you want some help installing the machines, just ask."

"That's very nice," said Ginger. Waves of relief washed over her.

"I'll do anything I can to help you," he pleaded. "Just keep the police out of this."

"How about the Zychotéch offer to purchase Waterbreathers?"

"Our board will meet this afternoon. We'll cancel it."

"Good."

"Ginger, I want you to understand that I have nothing against you personally. It was just business."

Ginger stared at Maytree, vacillating between delivering a snappy retort—she thought of several—or an extended lecture. She decided that neither was worth the trouble. "Thanks for calling, Roger. Good-bye."

She slipped into the water and swam to Darrell's apartment. The sun was shining brightly and cast bright ripples across the buildings. Barbara let her in.

Darrell was sound asleep—the slug. Ginger shook him awake and waited until he had thrown his legs over the bed and opened his eyes.

"I thought you'd like to hear about the telephone call I just received," she said. ■

Dr. Robert L. Forward

POLESITTERS

A communication satellite
doesn't *have* to orbit the Earth. . . .

Nearly everyone knows about communication satellites, and even those that don't unknowingly benefit from them nearly every time they make a long distance telephone call or watch the news on television. Communication satellites are special spacecraft carrying radio receivers and transmitters that are used for long-distance transmission of telephone conversations, computer data, and television programs from one point on the Earth to another.

The communication satellite concept was invented by Arthur C. Clarke, the famous engineer and writer. In an article in "Wireless World" in 1945 (12 years before the beginning of the space age), he pointed out that there is one particular orbit that is uniquely suited for communication satellites, the equatorial geosynchronous orbit (sometimes called the "Clarke Orbit"). The geosynchronous orbital arc is situated over the Earth's equator, at a distance of exactly 42,164 kilometers (about 6.6 Earth radii) from the center of the Earth. In this orbit, the orbital period of the satellite is the same as the rotational period of the Earth of one sidereal day (23 h 56 m 04 s). Because of the synchronous rotation of the Earth and satellite, to an observer on the Earth the satellite remains fixed at a single point in the sky,

as if it were at the top of a tall tower.

The first geosynchronous orbit communication satellite, Syncom 2, was built by Hughes Aircraft Company and launched in 1963. The first profit-making communication satellite, Intelsat 1 (Early Bird) flew in 1965 (20 years after Arthur Clarke's prediction). Today there are dozens of communication satellites in equatorial geosynchronous orbit, with dozens more planned. Billions of dollars of profits are now pouring down to Earth from Arthur Clarke's "pie-in-the-sky" idea. (Arthur has mentioned occasionally that he regretted that he didn't file for a patent on his idea, although the patent probably would have expired before there were any royalties to be had.)

But there are problems with the geosynchronous orbit communication systems. The prime spaces along the geosynchronous arc (such as the midpoints over the oceans between two continents) are already crowded. Poor nations not yet capable of spaceflight are bickering bitterly with the rich spacefaring nations in attempts to obtain "guaranteed" future allocations of positions or "slots" along this "limited natural resource." In addition, the geosynchronous orbit is most useful for communications between the points on the Earth that lie near the equator where the

ground station antennas can point more or less toward the zenith. Because of local topography and high attenuation through the atmosphere at low elevation angles, geosynchronous satellites are relatively useless at high latitudes on the Earth near the polar regions. What is needed is a spacecraft that will stay motionless in the sky like the geosynchronous satellites, but near the polar regions, not the equatorial regions.

Well—like Arthur Clarke—I have invented a new space communication concept. This new system can supply that needed *continuous* communication service to those neglected regions near the poles. However, recalling Arthur Clarke's past experience, I have filed for a patent on my idea. It is US Patent Application "Statite Apparatus and Method of Use," Serial No. 07/294788, filed on 9 January 1989.

This new type of space communication system is unique in that it uses a spacecraft that does not orbit the Earth. Since the spacecraft is not in orbit around the Earth, it is not a satellite of

Earth. Since it is not a satellite, I have coined the generic name of "statite" for it, since it remains essentially static or stationary in space with respect to the Earth. It is a "Polestat" or "Polesitter," that hangs over either the North or South Pole.

To properly appreciate the statite concept, it is important to realize that all of the thousands of space objects presently in orbit around the Earth fall in an essentially closed trajectory around the planet under the influence of gravity. Although the satellites may carry a small reserve of fuel to alter their orbital trajectory, all space objects currently adjacent to the Earth spend the vast majority of their existence freely falling such that the centrifugal force generated by their orbital motion exactly balances the Earth's gravitational force.

In contrast, the statite is a space object that does not use centrifugal force from orbital motion about the Earth to counteract any significant portion of the Earth's gravitational force. Instead, as is shown in Figure 1, the statite uses a

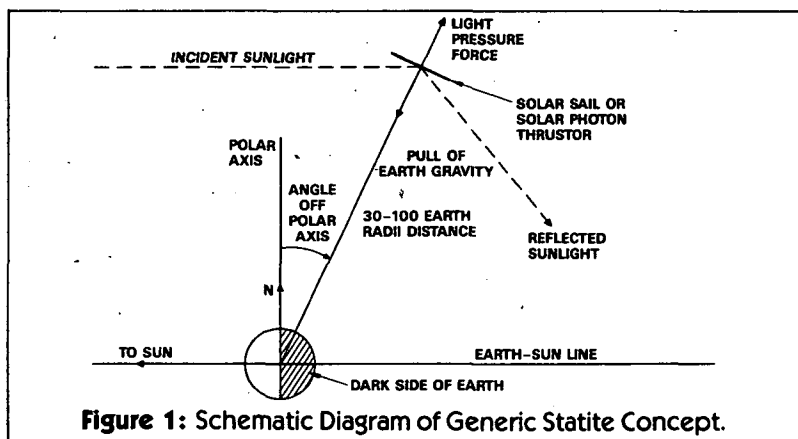


Figure 1: Schematic Diagram of Generic Statite Concept.

solar sail to maintain the statite and its payload in a desired non-orbiting fixed position above the Northern or Southern Hemisphere of Earth by exactly balancing the Earth's gravitational force with light pressure force.

In some version of the system the statite is kept directly over the North or South Pole of the spinning Earth. To an observer on the Earth, the statite stays fixed above the pole while the stars rotate around it. In these versions of the system, the ground stations can use fixed mounted antennas and simple fixed gain, fixed frequency electronics similar to that used in the ground stations for similar services supplied by satellites operating in the equatorial geosynchronous orbit.

In other versions of the system, the statite is offset from the polar axis. It stays fixed at a point above the dark side of the Earth, while the Earth spins beneath it. The statite does *not* have to be positioned directly opposite the Sun. The statite can be placed anywhere over a large area on the dark side of the Earth. This allows a very large number of statites to be placed in the sky without interfering with each other. This is in contrast to the limited number of slots available along the single *linear* arc of the equatorial geosynchronous orbit.

From the viewpoint of an observer on the rotating Earth, the statite rotates around the pole once every solar day (24 hours). Thus, ground stations for communication with these versions of the statite systems must have their antennas on a polar mount with a 24 hour clock drive. Since the distance between the ground station and the statite does

not change significantly in magnitude, and the doppler shifts are very low, the electronics needed in the ground stations for these versions of the system are nearly as simple as those at the fixed position ground stations for the equatorial geosynchronous satellites.

Using reasonable numbers for the size of a practical solar sail and the mass of payload, the typical distance of a statite from the center of the Earth will be between 30 and 300 Earth radii. For comparison, geosynchronous orbit is at 6.6 Earth radii and the Moon is at 63 Earth radii. Thus, one disadvantage of a realistic statite system is that the round-trip delay time will be a number of seconds, making it more suitable for broadcast, data transmission, and weather services than two-way telephone conversations. For 30 Earth radii, the round trip delay time is 1.3 seconds, while for 100 Earth radii, it is 4.2 seconds.

Although the altitude of the statites will be comparable to the distance to the Moon, the statites will be above the polar regions of the Earth while the Moon will be above the equatorial regions. Thus, although the Moon will cause some gravitational perturbations of the statite that will have to be handled by the statite control system, there is no danger of collision.

Depending upon the way in which it will be used, the statite communications system can be operated in a number of modes. These modes of operation include the fixed polar angle mode, the variable position mode, and a mode involving "formation flying" with the Earth in a levitated solar orbit.

In the normal mode of operation the

statite is always kept at a fixed angle from the polar axis. This angle will have to be greater than 23.5° because the tilt of the polar axis of the Earth takes each pole 23.5° to the sunward side of the Earth during one of the solstices, and the statite has to stay over the dark side of the Earth to catch the sunlight at the right angle. As shown in Figure 2, the worst case for a statite serving the northern hemisphere comes at the summer solstice, when the polar axis angle with respect to the terminator is -23.5° . The sunlight is hitting the sail at such a glancing angle that the thrust level available becomes very small. To get enough

thrust, realistic statites will be at angles of 30° to 40° from the polar axis. To an observer on the ground, the statite will travel around the North Pole in a circle that is 30° to 40° away from the pole star. Statites at these angles over the North and South Poles could provide services all over the United States, Europe, Alaska, Canada, all of the USSR, Northern China, Argentina, Chile, New Zealand, Southern Australia, South Africa, Madagascar and, of course, the Arctic and Antarctic, which cannot use the satellites on the equatorial geosynchronous orbital arc at all.

Instead of keeping the statite at a con-

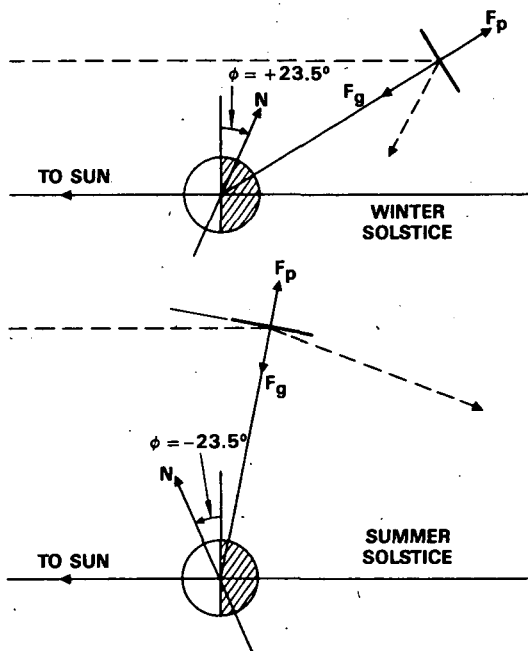


Figure 2: Operation of a Statite at a Fixed Polar Angle.

stant angle from the polar axis and a constant distance from the center of the Earth, another mode of operation would be to keep the statite as close to the polar axis as possible. The statite would be put directly over the pole during that time of the year when the polar region being served is on the dark side of the Earth (around the winter solstice for the North Pole), so as to provide maximum service area. During the summer, when the North Pole is in sunlight and there is an unfavorable Sun angle, the statite would have to be moved off the polar axis position. This mode of operation would require more complicated ground station antennas capable of nodding once per year in addition to rotating around the pole once per day, and service to the more equatorial areas would be interrupted during some times of the year. A version of this mode of operation would be to allow the statite to drift higher in altitude at unfavorable Sun angles in order to lower the gravitational force and allow the statite to be operated a few degrees closer to the zenith.

A very different mode of operation of the statite system is possible that would allow the statite to be placed at *any* point around the Earth (specifically over the poles), at *all* times of the year, even over the *sunlit* side, at the expense of a greater operating distance. Instead of the statite being balanced by sunlight in the gravitational field of the Earth, the statite would be placed in an orbit around the Sun, at such a distance from Earth that the gravitational field of Earth plus Moon is only a perturbation on the gravitational field of the Sun.

The solar sail propulsion system would

then be controlled so that the statite traveled in a slightly elliptical orbit around the Sun with a period equal to the Earth orbital period of one year. The light pressure would be used to "levitate" the plane of the statite orbit above or below the ecliptic plane, and to vary the radius of the orbit during the year so that the statite moved inside and outside the orbit of the Earth. This mode of operation is shown in Figure 3, showing the statite above the North Pole at the equinoxes and the solstices. The result would be that, to an observer on the Earth, the statite stayed fixed above one of the poles of the Earth. Thus, although the spacecraft is a "satellite" of the Sun, it is a "statite" of the Earth.

The optimization of this "Polesitter" mode of operation is still under analysis. It is obvious that when the Earth's North Pole is tilted away from the Sun and on the dark side of the Earth (during winter), that it is easy to place a statite at a relatively low altitude directly over the pole. I have calculated that there is a stable solution for the statite position when the North Pole is pointing at the Sun. By flying the statite at a point high above the North Pole, the statite is in an orbit around the Sun that has a smaller radius than Earth's orbit, yet it would be if it were traveling in a pure gravity orbit of that radius. As a result, the centrifugal force of the motion about the Sun is not balancing out all of the gravitational attraction of the Sun. It is this residual gravity pull of the Sun that is counteracting the gravity pull of the Earth, keeping the statite hovering over traveling at the same angular velocity as the Earth, which is lower than it

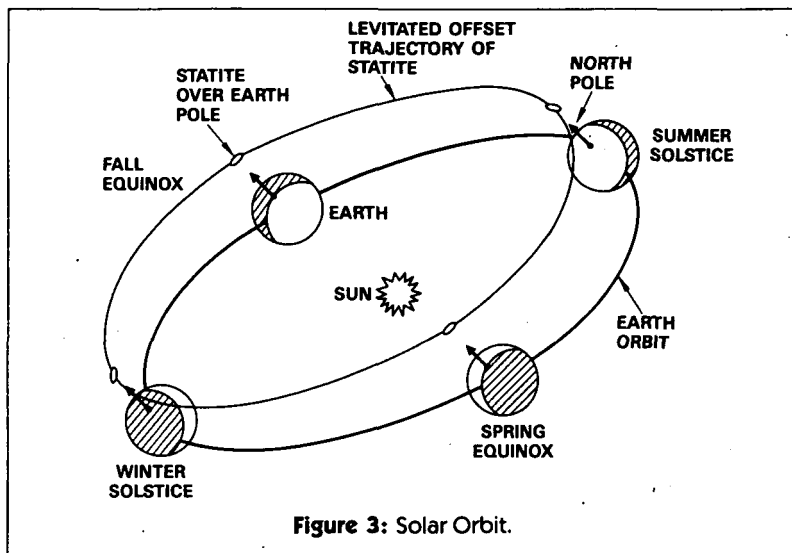


Figure 3: Solar Orbit.

the North Pole. The preliminary calculations show that stable operation during summer solstice is possible at a statite altitude of about 300 Earth radii. This distance will give round trip time delays of 10–12 seconds, which would be acceptable for broadcast services and some data links, although not telephone conversations.

Whatever version of the statite concept is eventually flown, the advantages of the statite concept are that it provides continuous service to a region using a single spacecraft without requiring a slot on the already crowded equatorial geosynchronous orbit. It also provides continuous coverage to regions of the Earth that are too close to the poles to use the existing equatorial geosynchronous orbit satellites.

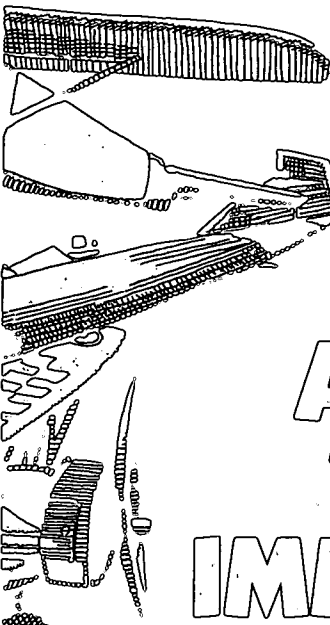
The disadvantages of the statite concept are that constant control of the statite sail is required to maintain station,

larger transmitting antennas will be needed because of the greater link distance, the round-trip link time is in seconds, and in most versions the ground station antenna must rotate once a day.

Yet there are a lot of potential customers that are not being adequately served by the present geosynchronous communication satellites. Those large numbers of potential customers mean potentially large profits to those who own the rights to the patents, provided the systems can be up and flying before the 17-year life of the patent expires. It will also take many millions to build and fly a demonstration model that can convince large investors to put up the hundreds of millions needed for an operational system.

Does anybody out there have a few million dollars in their back pockets they would like to risk on another “pie-in-the-sky” idea? ■

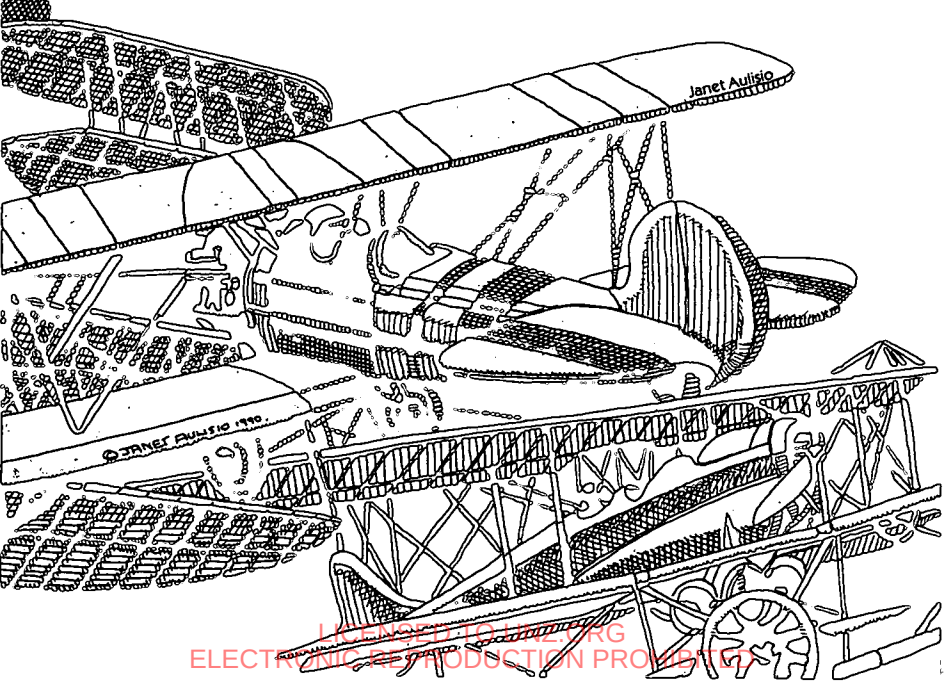




Anything that has drastic
benefits for most people
is likely to hurt a few—
and will surely mean
big changes for all.

W. R. Thompson

LIFE AMONG THE IMMORTALS



The car swerved across three lanes, and only a surge of fear and adrenalin saved Carl from death in the crosswalk. Two long, fast strides carried him out of the car's path. He tripped on the curb and went sprawling among the other pedestrians.

The car slammed through the intersection as if nothing had happened. A truck had made a wide turn through the intersection, crossing the yellow divider line and getting in the car's way. The driver had swerved to avoid a head-on collision.

At fifty miles an hour, Carl thought, rising to his feet. Idiot, thought it was safe to speed—

"Mister, are you all right?" a little girl's voice asked.

Carl looked down and saw concerned eyes looking up at him. He managed a smile. "I'm fine, thank you."

"Then how come you're bleeding?"

"Bleeding?" Carl became aware of a pain in his right hand. He looked at it and saw where he'd scraped his palm when he fell.

Expecting someone to answer her, the girl turned to the woman with her. "Momma, how come he's bleeding? What's wrong with him?"

"Don't ask things like that, Melissa." She sounded embarrassed. "Come on." The woman picked up her daughter. She stepped out into the crosswalk, against the light. A car screeched to a halt as she walked on, unconcerned.

Carl turned away, clenching his fists despite the pain in his hand. *Damn fools, damn fools, what's wrong with people anymore?*

He had walked half a block before he

looked at his hand again. The scraped palm still bled, and there was dirt in the wound. Carl knew he had to take care of it before it became infected.

He walked six blocks before he found a drugstore. Amid people buying diet foods, vitamins and microbot pills he found a bottle of rubbing alcohol—the nearest thing to a disinfectant still on sale—and a small bag of cotton swabs. He paid for it left-handed, not wanting to upset the girl behind the counter.

Or, worse, to have her pity him.

There was a small park across the street from the drugstore. Carl hurried across the intersection, the sound of car turbines loud in his ears. Safely across, he sat down on a park bench, opened the bottle and poured the alcohol onto the scrape.

"How can you do that?"

Gritting his teeth against the sting, Carl looked up and saw a woman facing him. She looked young and pretty, and her gray eyes were wide with astonishment. "It's easy," Carl told her through his teeth. "You take the cap off the bottle, hold out your hand, and *pour*."

She brushed a wisp of straight black hair from her face. "It must hurt—"

"Of course it hurts." Carl got out a cotton swab and wiped at the scrape. "It just beats getting in-fec-ted." He felt an ugly pleasure as he drew out the word. It was good to jam that bit of reality in some gawker's face. He was tired of being a curiosity, of being a permanent outsider. *Sick of it, so to speak*, he thought grimly.

The woman nodded. "I know it does—I mean—"

"You mean you've heard all about

it." Carl decided the injury was adequately disinfected now. He threw the bottle and cotton into the trash can behind the bench. "What are you, some kind of ghoul? Or are you one of those mercy freaks who likes invalids—"

"Drop dead!" she snapped. She spun on her heel and strode away.

"You first," Carl muttered. Not that she would, he knew. Barring accidents, she was immortal. He was not.

Carl wrote for a sports magazine. He specialized in stories on air shows: races, aerobatic flying, barnstorming. The magazine's readers liked his style, and he knew what they wanted to read.

He came into his office, sat down at his desk and switched on his word processor. At the moment he had two articles in progress. One, almost completed, was a profile of this year's Wiley Post Cup winner. John "Crash" McCreaty had won at the Chino Circuit, flying a reconstructed F-86 Sabrejet around the figure-eight course in record time.

He almost lost, Carl mused, as the processor did the final spelling check. The lead plane had been a MiG-17 Fresco, home-built by its pilot and ground crew. The MiG pilot had lost too much altitude in a turn and plowed into the ground.

Augered in, Carl thought. He stopped the spelling check and inserted that phrase into a paragraph on the race. It was a stock phrase, a cliché, but his readers expected it. The words helped express the danger, the *thrill*, of air racing.

Carl put the article in the printer queue and turned his attention to the

second article. It was an editorial on air show safety. The Federal Aviation Agency required spectators to remain at least one thousand feet from the edge of the field when pilots were engaged in racing, stunt-flying or precision aerobatics.

The thousand-foot rule is excessive, Carl wrote. *While it protects the audience from the risk of an occasional crash, this distance denies paying spectators a clear view of events. Racing aficionados are willing to accept a slight increase in danger for an adequate view of the most exciting sport in the world. Grown people don't need the government to hold their hands and decide when something is too dangerous for them. Someone should tell the FAA that we know what's in our own interests.*

The thousand-foot rule is an insult to pilots as well as to spectators. Consider: a race pilot spends millions to refurbish an historical plane, or to build a replica from plans. The work takes years. While accidents happen, no pilot is going to fly so recklessly as to risk destroying his investment in his plane! And pilots want to live, too. They don't fly to kill themselves. That kind of aviation went out with kamikazes.

The FAA talks about risk. The truth, as shown by the government's own statistics, is that watching an air race or other event is actually safer than crossing the street.

With a grimace, Carl decided that he'd written enough for today. He pushed the *save* key and turned off the processor.

He looked at the fax photos on his desk. The pictures accompanied the article on Crash McCreaty: McCreaty

making a turn at Chino, McCreaty in the cockpit of his F-86, McCreaty and his ground crew. The pilot looked to be fifty, although Carl knew he was over a hundred. The microbots in his bloodstream had reversed the aging process, but it would be a few more decades before the machineries of immortality finished their work.

Carl scrawled a caption on the bottom of one photo, then searched through the rest of the stack. There was a shot of the MiG as it went down, erupting in a ball of greasy fire. Carl wrote a comment about daring and risk and pushing the limits; the readership wouldn't appreciate the chances McCreaty took if they didn't see the losing side of the odds once in a while.

Carl called it a day and went home. He walked; the exercise did him good, he knew, and he was convinced it was safer than driving the six blocks from his office to his apartment. His hand throbbed a bit; the scrape was still tender. When he got home he took a painkiller and the ache went away. He poured himself a drink and went into the living room.

Carl had a small display case in his living room, a glass box holding a dozen scale-model aircraft. The Wright *Flyer*, the *Spirit of St. Louis* and other historical flying machines rested under the glass, looking as if they had been temporarily snatched from the edge of the unknown to glitter here. "To better times," Carl muttered, toasting them with his drink.

He sat down in front of the TV and hooked into the sports service. The programmer showed him a score of reports on the air show circuits. Most of the

items were not important, but the last story described a team which was building a duplicate of the X-1, the first aircraft to break the sound barrier.

Carl made a note to look into that. With luck he could get several articles out of it: the reconstruction, the first flight, and the publicity tour. They would be easy articles, he reflected. There was almost a formula he could follow for each. He was thinking about it as he dozed off in front of the TV.

The throbbing in his hand woke him the next morning. *Infected*, he thought, as he got out of his chair. The angry red swelling on his palm told Carl that he hadn't disinfected the scrape in time. He put a bandage over it and called his doctor.

"Carl Heath," he said, when the receptionist answered the phone. "I need to see Doctor Bailey. I have a bad cut and I think it's infected."

"How—" He heard the tapping of a keypad over the phone, and he knew the woman was consulting her files. Then she made a surprised noise. "*Oh*, Mr. *Heath*, of course. Doctor Bailey can see you right away."

"I'll be there in an hour or so." Carl spoke casually, in reaction to the receptionist's shock. After all, an infection wasn't an incurable condition, even if it was a symptom of one.

The doctor's office was at the other end of Manhattan, which made it too far to walk. Carl could have driven, but a few stiff flexes of his hand told him that he couldn't grip the steering wheel properly. There was the subway, of course, but he didn't want to have people staring at his bandaged hand.

That left a taxi. He went in front of

his apartment building and hailed a cab. "Where to, bud?" the driver asked as he got in.

"The Rutgers Clinic. You know where it is?"

The driver nodded. "I know the whole town. Meter on." The meter box started counting the toll as the cab pulled away from the curb. "You a doctor or something?"

Carl shook his head. "No, I'm a writer."

"Going to write about medicine, huh?"

"I've been thinking about it." *A little white lie*, Carl told himself. He didn't have to talk about his health often, but when he did he found that he had to lie. The alternative was to become known as an ephemeral in a world of immortals. His problem was genetic, an allergy, not at all contagious—but people who knew about his condition often shied away from him as though he was the Angel of Death.

At the Rutgers Clinic Carl paid off the cabby and went inside to Dr. Bailey's office. As he had expected, the waiting room was empty. There were few doctors still in business, and there were even fewer patients. The receptionist ushered him straight into the examining room.

"Well, it doesn't look too bad," Bailey said as she inspected his hand. "When was your last tetanus shot?"

"Seven months ago," Carl said. "It's on my record."

Bailey glanced at the room's screen and nodded. "Yes, everything's in order," she said. "I'll let my assistant handle this. He's seen more of this than I have."

Carl felt blank. "He has? I thought REE allergy was rare."

"It is," Bailey said. "No one sees much of *that*. But there's always some idiot who forgets to take his pills. His health-support microbots wear out and don't have the raw materials to rebuild themselves, and the next thing he knows, he's sick. So poor Jim sees a lot of runny noses and inflamed cuts."

Bailey left the room, and a while later her assistant came in. "This is nothing," he said, as he worked on Carl's hand. He painted it with an anesthetic, then probed the swelling. "I saw a case of gas gangrene last year. A surgeon had to amputate the patient's arm at the elbow. It took six months to grow back, and he said *that* would teach him to remember his pills."

"I'll bet it did." The assistant's chiding tone annoyed Carl. Did the man think he'd asked to be REE-allergic? He watched in silence as the assistant finished cleaning his palm and put a bandage over the cut.

"One last thing and you're out of here," Jim said. He took a hypodermic from a cabinet, filled it and pressed it against Carl's bicep. Carl felt the medication spray through his flesh.

His chest tightened. Carl recognized the sensation at once. He had felt it when he was six, when the family doctor had injected him with a set of health-support microbots. Difficulty breathing, heart pounding—"That shot," Carl gasped. "What—"

"It was the usual—antibiotics, HSM and REE-compounds," the assistant said. "Your old microbots are obviously dead, so—"

"Idiot." Carl's head spun. He clutched

the examining room table. "I'm REE-allergic—" He felt himself slide to the floor.

Not fair, he thought through the roaring in his head, *not fair, I was supposed to have another thirty or forty years left, dying now isn't fair!* His vision went black.

Distant voices came to him. ". . . I'm giving him broad-spectrum antihistamines and REE-chelators. Jim, didn't you read his case history first?"

"No, I just assumed he'd forgotten to take his pills."

"Well, he didn't. He's allergic to rare earth elements."

"Gee, that's pretty rare, isn't it?"

Nearly got a little rarer, Carl thought. His vision cleared and he found he was on the floor. Bailey and her assistant were bending over him. "Are you feeling better?" Bailey asked him.

"Yeah." Carl staggered to his feet. "I'm a bit light-headed."

"It'll pass," Bailey said. She helped him straighten his coat. "It was just a slip in our communications. Jim assumed—"

"I heard."

"I gave you a shot of chelators," Bailey said. "Those are chemicals which neutralize the rare earths. They'll be expelled through your kidneys, so drink plenty of—"

"I know what to do!" Carl pushed past her and went out of the examining room. Out on the sidewalk, he saw a cab cruise past him, its driver looking for fares. Carl started to wave at the cab, then changed his mind. *Walk it off*, he told himself. When he was angry he always went for a walk, to give himself

time to calm down. Walking off a mad, he called it.

A cold rage filled him now—not at his brush with death, but at Bailey's casual attitude. She and her assistant had almost killed him, and it was no big deal to them.

At least the attack wasn't as bad as when I was six, he thought. Twenty years ago his reaction to the microbots had taken everyone by surprise. It had been sheer luck that the family doctor had recognized his reaction as an allergic attack. Carl had spent a week in the hospital while he recovered.

Carl hadn't understood the implications of his allergy until he was a teenager. Microbots had revolutionized medicine. They could recognize and destroy viruses and bacteria and cancer cells, accelerate the healing of broken bones, regenerate lost tissues and repair damaged DNA. Experiments on lab animals—and, within a few years, observations from daily life—proved that health-support microbots could reverse the aging process, keeping a human body young and healthy.

Microbots were not perfect. They were machines, and like all machines they wore out. They could reproduce themselves, building their own replacements, but only if the proper raw materials were available in the host's bloodstream. Some of those materials were rare earths. Most people took a pill once a week, giving themselves the building blocks of immortality.

All except me, Carl thought as he walked along. All medical techniques had flaws, and immortality was no exception. One human in five hundred thousand shared Carl's allergy, and

those ephemerals could expect to live out what was no longer considered a normal life span. *If we don't get hit by a car*, he thought. *Or killed by a doctor too incompetent to read a case history—*

Carl felt his breath coming in short gasps. *Allergy?* he wondered. Then he recalled that foreign substances filled his veins: painkillers, rare-earth compounds and chelators. Add to that the allergy attack in the doctor's office. He didn't feel sick, but he didn't feel healthy. He stopped and sat down on a bus bench to catch his breath.

"I use soap and warm water."

Startled by the woman's voice, Carl looked behind him. He saw the same woman who had gawked at him yesterday, looking at him with impatience in her gray eyes. "What was that?" he asked.

"When I cut myself, I use soap and warm water." She walked around the bench and sat down. She faced him, although she left several feet of bench between them, and she sounded as though she'd rehearsed this. "That's what I meant to say yesterday. And I'm sorry I told you to drop dead. It was just the worst thing I could think of, and I was so mad—"

"You're REE-allergic?" he asked, cutting her off.

She nodded. "I would have said so yesterday, but I got mad. After you went away I realized what it must have looked like. I hate it when people stare, too."

He nodded. "I'm Carl Heath."

"Alice Curtis. Everyone calls me Sally." She looked at him and seemed to shrink away. "You're sick. Are you contagious?"

"It's just medication. My hand got

infected." He smiled slightly. She was REE-allergic, all right, an ephemeral. These days no normal person worried about catching a disease. "Next time I'll try soap and warm water."

"It stings less than alcohol," Sally said. "You look worn out. Do you need a ride home?"

"I am and I do."

Sally smiled. "Wait here. I'll be right back."

Sally returned a few minutes later, driving a car which Carl thought she must have bought third-hand. Carl climbed into the front seat with her and gave her directions to his apartment. "How did you happen to notice me?" he asked her. "I mean, do you live around here?"

"I work across the street, in a health food store." She smiled as she spoke, but she kept her eyes on traffic. "I like to eat lunch in the park."

"A health food store," Carl said. That had a weirdly archaic sound. "I wouldn't think anyone would bother with health foods."

"You'd be surprised," Sally said. "There are athletes, and people with weight problems, and gourmets. Plus folks who think their microbots work better when they eat healthy." She laughed with him. "So. What kind of work do you do?"

"I'm a staff writer for a sports magazine."

"That sounds interesting."

Carl shook his head. "It isn't."

Sally looked puzzled. "I thought writing was glamorous work."

"Not the kind I do. Profiles of pilots and mechanics, write-ups on their ma-

chines, the latest races—after a while it's all the same."

"Oh. I don't read much," Sally said. "Not since college. I always mean to, but there's never any time. Is this your street?"

"Yes, turn left here." The car turned the corner and slid to a stop. Carl got out, and by the time he remembered to thank Sally for the ride she had already driven away.

Good news, sports fans! The House of Representatives has just passed a special bill, the Barker Bill, which requires the FAA to lower the thousand-foot safety margin to five hundred feet. While this reduction isn't as great as we would like, it's still a vast improvement. The Senate is scheduled to vote on it next Tuesday, so if you enjoy good viewing at air shows—and who doesn't?—get in touch with both of your senators. Phone them, write them, fax them, but let them know you support the Barker Bill.

Carl saved the article, tagged it as an editorial bulletin and sent it to the typesetting computer. *Damn fools*, he thought without heat. *Including me, I'm pandering to them.*

"You look unhappy." Anna Jennings, the editor, stood in the entry to his cubicle. She was the only person on the staff who talked with Carl about anything beyond business. He knew his condition made the others nervous; he frequently wished he had the same effect on Anna. "What's on your mind?" she asked.

"The Barker Bill." He gestured at his terminal. "I just did an editorial on it."

"Hm—that thousand-foot thing?"

Carl shook his head. "They're cutting it to five hundred feet. I just urged our readers to lobby the Senate to pass it."

"I can see why you're unhappy." Anna came in and sat on his extra chair. She was in her mid-sixties, although she looked twenty and acted younger. "Nobody likes to compromise. Still, a five hundred foot cut is better than no cut at all."

"That isn't it," Carl said. "The limit should stay at a thousand feet. It's safer for the public—"

Anna looked cross. "Our editorial policy—"

"I know, I know. 'Acceptable risk.' Give the public what they want. It's just that—"

"—you think about death a lot," Anna said, "and you think you're—what? Working as a front man for the Grim Reaper?"

"Sometimes I feel that way," Carl said. Anna's bluntness annoyed him, but she had done nothing more than put words to what he felt. "Here I am, telling people to demand the right to get killed, and for what? So they can stand underneath an airplane when it pulls out of a dive? For a thrill?"

"So they can do what they want with their lives," Anna said patiently. "We both know what the real problem is."

"Do we?" he asked sourly.

"That damned allergy makes you preoccupied." Her lips moved in a fashionable imitation of the Mona Lisa's smile. "We ought to make you preoccupied with something else."

"I'm already occupied," Carl said, fighting down his distaste. The nearness

of death, it was said, made one live more intensely and heightened one's romantic ardor; imagine how that must apply to someone who lived every day with the knowledge of his own inevitable demise. That gave some people a ghoulish interest in ephemerals, but Carl had never developed enough cynicism to allow himself to use them. He was not going to allow REE-allergy to turn him into an object.

Anna took the rejection with reasonable grace. "Well, when you change your mind. . . ." she said, and left his cubicle.

It might be different if she liked me, Carl thought. Unfortunately Anna Jennings seemed indifferent to him, outside her morbid curiosity. She could never remember if his name was spelled *Carl* or *Karl*, and she seldom listened to his suggestions at staff conferences.

Carl left the office a few minutes later. A health food store, he thought, as he walked down Madison Avenue. He must have passed the place hundreds of times, but he'd never noticed it. Then again, he mused, how often did he notice the other stores and shops between the office and his apartment?

He found the store across the street from the park, between a tobacconist and a jeweler. It was a small place, its shelves loaded with cans and packets of exotic foods. Carl saw Sally in the rear of the shop, arranging the stock on a shelf. "I didn't say 'thank you' yesterday," he said. "Thanks for the ride."

"You're welcome." She reached into the carton on the floor, picked out a box, fumbled, and dropped it.

Carl picked it up. "Instant rice curry?" he asked in surprise.

"Made with artificial meat and guaranteed-natural ingredients," she said, and shrugged. "As opposed to unnatural ingredients, but it sells."

"Is it any good?"

"No . . . but there's an Indian restaurant down the street that serves a great rice curry. Would you like to try some?"

"Yes, I would."

"Fine. Give me a minute to lock up."

"Sure." Carl watched as Sally went to the cash register. "This is your store?"

"For the past two years," she said.

"The original owner hired me because I'm REE-allergic. She figured that I'd have to know all about nutrition. For my health."

"Did you?"

Sally shook her head. "I learned, though." She locked the register and set the alarm control on the wall. "I'm ready."

The Indian restaurant was two blocks from the store, and it had a name which Carl couldn't pronounce. The service was fast, however, and good; five minutes after they sat down he and Sally were faced with two steaming bowls of curry. "It's spicy," she warned him. "The trick to eating spicy foods is to *not* to take a drink after every bite."

"Oh?"

"Just let your mouth get used to the spices," Sally said. "After a few bites it won't seem so hot."

"OK." Carl took a spoonful of curry, swallowed and gasped like an asthmatic dragon. By force of will he kept his hand away from his water glass. "How do I get through the first few bites?" he asked in a strangling voice.

"Close your eyes and think of England." Sally smiled as if that was a joke he should have known. "It gets better after the first time."

After a few more bites Carl decided she might have been right. He was beginning to taste things through the roasting heat of the spices. "God help me, I could get to like this," he said at last.

"It takes a while," she said. Sally hesitated before speaking again. "Which magazine do you work for?"

"*Air Race Monthly*," he said.

"From what you said yesterday I gather you aren't happy there."

"Not especially," he said, and shrugged. "But it's a living. I've worked there ever since I graduated from college."

Sally looked interested. "Is it what you planned on doing?"

"No. I majored in aeronautical engineering, but when I graduated I couldn't find a job. Health reasons," he said. "Nobody wants to hire a REE-allergic—you know how it is."

"You might break a leg or get appendicitis, and be laid up for a month," she said. "Or get cancer, or inhale a poisonous gas and die. I heard the same things when I tried to get a job. I've got two degrees in biochemistry and no one will touch me. Everyone says they don't want to endanger my health, or that I'd lose too much time being sick."

Carl nodded. He understood perfectly. "So you wound up as a clerk in a health food store."

"That I did." She hesitated again. "How did you come to write for a flying magazine?"

"Well, I'm a good technical writer,

and I've always liked flying. The two just went together."

She nodded. "Are you a pilot?"

"No," Carl said. "I always wanted to fly, but I couldn't pass the medical exam. The allergy—" He shook his head angrily. "Just once I'd like to get away from that."

"So would I," Sally said. "The trouble is that it pretty much defines who we are, doesn't it?"

"Even when it shouldn't," Carl said. He made himself smile for her. "You know, I can't even figure out *why* it means I can't get a pilot's license. Maybe the FAA is afraid a REE-allergic might come down with pneumonic plague, or the Malaysian brain rot, or something, and drop dead at twenty thousand feet."

"Maybe. Government regulations don't always make sense." She took a spoonful of curry. "I work with food, so twice a year I have to prove I don't carry any contagious diseases. Only when was the last time you saw a real disease? Diseases can't spread when everyone is immune to everything. I can't even figure out why the Health Board is still in business."

"Bureaucracies have the only true form of immortality," Carl said. And after that they found other things to talk about. Sally shared his liking for jazz and old movies, and Carl learned they could disagree about things without arguing. Even more to his surprise, he discovered that Sally could persuade him that he'd been an idiot to help reelect the president last year, and that she could do that without seeming opinionated.

It had been a long time since he'd

talked like this with anyone. Not a serious conversation, he reflected, but one with depth. It was as pleasant an evening as any he could remember.

According to Chief Pilot Howlin' Jack Howe the most difficult task in re-constructing the Bell X-1 is the shortage of reliable plans, especially for the manufacture of appropriate alloys. While modern materials would be more durable and reliable, the High Thrust Project plans to make their aircraft into a perfect duplicate of the first manned machine to break the sound barrier.

The Project expects to have its aircraft ready for flight by next February. The X-1 should make its first appearance on the air show circuit in May, when bloodthirsty crowds can squeal at the sight of some airhead risking his neck blahblahblahblah

Angry with himself, Carl erased the last line. *You can't let it get to you*, he thought as he pushed his chair back from his desk. He couldn't afford to mess up. This was a good job. It paid well and his health didn't matter, and if he lost this job he'd have trouble finding another one.

Carl looked at the terminal and decided he couldn't finish the article now; the formula wasn't working. He would go home, do some research on his next article, and wrap up this X-1 thing later that night. That was how he worked best: put something aside when he was stuck on it, and let his subconscious mull it over while he distracted himself with other matters.

He was halfway to the office door when Anna stopped him. "Have you finished that X-1 thing yet?" she asked.

"No, I'm only halfway through it."

"The deadline is noon tomorrow," she reminded him.

"I'll have it done by then," he said in annoyance. "Have I ever missed a deadline?"

"Usually you're days ahead of them," Anna said. "That's why I'm asking. Is something wrong?"

"Just the usual."

"That REE thing," Anna said, shaking her head. "You really ought to lighten up." There was that Mona Lisa smile again. "If you need a little expert help with that, remember you've got a standing invitation." She walked away from him.

She never quits, Carl thought as he left the office. Anna couldn't take the hint of constant rejection. There was, he mused, something almost childish in her stubborn pursuit of him.

Carl took the subway home. He read a newspaper, holding it between himself and the world. He read an article which described the increasing robotization of industry and agriculture. *Too many people would rather go on the dole than dig mines or work on the farm*, he thought, unconsciously translating the article's double-talk. It was almost impossible to find people who wanted to do the dull, necessary work of civilization. Fewer people went to college, made investments, became scientists. It was as if people had decided they had better things to do with their time.

Although hidden behind the newspaper Carl couldn't block out the conversation of two men sitting near him. "Just like in a Hemingway movie!" one was saying.

"I thought it was illegal," the other

man said. "You know, the SPCA and all that stuff."

"Come on, bull fighting has been legal for years. You talk about excitement, you should see a matador like Kowalski take care of a prime Mexican bull. He does things with a cape and barbed shafts you wouldn't believe, and the way he puts in the sword at the end, I'm tellin ya, he's an artist." The sub-way stopped and the two men got off.

Behind his paper Carl shook his head in disgust. Bull fighting. It was bad enough that bare-knuckle boxing was back, and that—if you could believe the rumors—some people were staging authentic Roman gladiator fights, but how could anyone be callous enough to enjoy the torture of a dumb animal?

When Carl got home he checked the sports services and the air show listings. Nothing major was in the works, although there had been a multiple crash at an air show in Dallas. One of the pilots was Nick Uchebnik, a well-known stunt pilot. *Which means I'll have to write an obit for the magazine*, Carl thought sadly. *That'll be, what, the tenth this year?*

The phone rang. "Hello," he said to the speaker.

"Carl? Sally. Mind if I come over?"

"No, I'd like that." He caught something in her voice. "Are you all right?"

"I just need to talk. I'll be over in a while."

The maidbot kept Carl's apartment immaculate, but he spent the next half hour straightening and adjusting things. He'd known Sally for three weeks now, and this was her first visit to his home. He felt a nervous need to put on a good appearance for her.

When she appeared at his door she refused to talk about whatever troubled her. She sat on the couch and talked about the weather while Carl mixed a couple of drinks.

"Here's one good thing about being REE-allergic," she said as Carl handed her a daiquiri. Carl raised an eyebrow; it was the first time either of them had mentioned that topic since their first date. She went on, "One drink lasts me for hours."

"There is that," Carl said as he sat with her. Technically alcohol was a poison, and no one had yet created a microbot which would ignore alcohol in the bloodstream. In order to get even slightly drunk, anyone using health-support microbots had to drink faster than the microbots could detoxify the alcohol.

And they drink that fast, Carl thought. The liquor industry did more business than ever before as it met the increased wants of the drinking public. The flip side of the situation was that alcohol-related diseases and accidents had almost vanished. *Dried up, so to speak*, he thought in vague amusement.

"They still happen," Sally said, when he repeated the joke to her. "Accidents, that is. I saw one when I was in college. This fraternity made their pledges drink a bottle of vodka while they drove around campus. One boy crashed while he was doing that."

"Did it kill him?" Carl asked.

"He walked away," Sally said, "but it threw his passenger through the windshield. One of his arms got all sliced up. He almost bled to death."

Carl nodded. Arterial damage was one of those things that microbots

couldn't repair unaided; the high-pressure blood rammed them through the opening before they could fasten themselves to the edge of the cut and heal it. People forgot that microbots were not magic; massive traumas could overwhelm them, killing their host before the machines could repair the injuries.

"Almost," Sally repeated. "I saw him climb out of the car and just stand there, screaming with pain, staring at his arm while the blood—" She stopped and finished her drink. "I was the only person in the area who knew enough to put on a tourniquet. That lowered the arterial pressure enough for the cut to heal."

"So you saved his life."

"And the next day he was in another car, with another drunken pledge," she said. "He didn't learn. I don't think he understood how close he came to getting killed."

"A common condition," Carl said. He put his drink on the coffee table. "I have to write these stupid editorials for the magazine, about how we have to do away with safety regulations at air shows. Let people stand right underneath flight paths, use dangerous fuels and unproven designs—things like that—"

"I want to know what happened," Sally blurted.

"Happened?"

"To you," she said. "That day I gave you a ride home. You looked scared. Really scared, like I've never seen anyone look outside a mirror. What happened?"

"I . . ." Carl shook his head. It was bad enough to remember that mess in the doctor's office. Somehow telling

Sally that a REE-allergic could die in the hands of a doctor would make it worse. "Just a close call. A stupid accident."

"Tell me. Please," she said. "I've wanted to ask you all along, but I couldn't work up the nerve. The look you had on your face has been giving me nightmares. Not knowing the facts is one thing I can't handle."

"I went to my doctor to get an infection treated," Carl said, speaking quickly. "Doctor Bailey let her assistant handle things. He didn't know I'm allergic because he didn't read my file. He pumped me full of microbots and REE compounds, and I had an attack. The doctor knew what to do, but it was close."

She shivered. "That's so *stupid*."

"I know. The next time I go to a doctor, I'm going to make sure everyone knows I'm allergic." As he had expected, she looked disturbed. He wanted to divert her attention from that. "You didn't come here to talk about this, did you? When you called—"

"I was watching a movie," she said. "A detective story, one where a psycho-killer strikes at random. I figured out the whole plot when one of the suspects turned out to be an ephemeral."

"And he was killing people because he's jealous of their immortality," Carl said. He'd seen the same plot a dozen times before he stopped watching police dramas.

"It made me depressed," Sally told him. "I kept imagining that people would wonder if I was thinking that way. We have enough problems—" She shook her head. "I get paranoid when I'm down."

"Sometimes getting paranoid is a good idea," Carl told her.

He could see how that surprised her. "You think so?"

"Yes—"

She started laughing. "I'm sorry," she said. "I'm so used to hearing fortune-cookie advice from people that anything else is a shock."

Carl smiled; it was better to see her laughing than despondent. "I didn't mean *be* paranoid," he said. "I only mean 'be cautious.' People aren't out to 'get' you, or me, but they're so . . . so careless that you should act like it."

"I suppose you're right."

"I'd hate to think I am. Let's forget about this. Why don't we go out, do something, have some fun?"

"'Go out'? When you've just told me things are so dangerous I should get paranoid?" Sally shook her head and patted the couch. "I'm staying right here."

It was only after Sally went home the next morning that Carl remembered the X-1 article. He sat down at his desk and hooked into his office terminal, wrote and polished a dozen paragraphs then sent them to Anna with an hour to spare on the deadline. With that out of the way he had breakfast, showered and dressed, and headed for the office.

Carl stopped at his mailbox, and found a letter from Dr. Bailey. He read it, tried to decide whether he should laugh or put his fist through a wall, and compromised by taking a cab to his lawyer's office.

Carl had the good luck to find his lawyer in his office. "I can understand charging for the office call," Carl said

as he finished his story. "But she expects me to pay for the microbots and the REE compounds, plus, so help me, 'trauma care!'"

"She has her nerve," Gregg agreed. He tapped the letter with a stubby finger. "This happened weeks ago. Why have you waited so long to take action?"

"I wrote the AMA about it—"

Gregg guffawed loudly. "The AMA! They can't help you, Mr. Heath. They're a research-oriented group these days. All they can do is advise you to see your lawyer. Which you're doing."

Carl nodded. "What do I do next?"

"Well—file a malpractice suit," Gregg said, half to himself. "A medical malpractice suit. It's been a while since law school, but I believe I know the procedures. I'll check things, and then I'll contact Bailey's lawyer. I presume she has one."

"I wouldn't know," Carl said.

"Of course not." Gregg shook his head over the letter. "A medical malpractice suit. Just when I thought I'd seen it all."

"Do you think it'll be a problem?" Carl asked.

"No. It's just rare, like a charge of barratry or aerial piracy. There are only a dozen doctors in this city—"

"Thirteen," Carl said.

"Very few," Gregg said. "Most of them are engaged in research—alleviating congenital defects, endocrinological imbalances, things microbots can't fix. They don't do much work with patients. Even you ephemerals don't get sick often, I understand."

"It still happens," Carl said, absently touching his hand. The bandage and

scab were gone, but the scar tissue was still fresh.

"Yes, of course." Gregg put the letter down. "I'll be in touch with you, Mr. Heath."

"Your lawyer doesn't sound too enthusiastic," Sally said that night. They were in a booth at an Italian restaurant, sharing a bottle of red wine before the waiter returned with their orders. "Do you think Gregg will do much with the case?"

"Probably not," Carl admitted. "There's no money in medicine these days, so he can't hope for a percentage of a big settlement. But I have to do something—I should have done this right away. We both have enough problems without quacks like Bailey. Maybe Gregg can get her out of medicine, or something."

"I hope so," Sally said. "I'd feel a lot safer if a doctor like that was put out of business."

"I'd feel safer, too." *And this isn't what I want to talk about*, he thought. It was strange that, after sleeping with her last night, he now felt as if he was dealing with a different woman. He was getting tongue-tied. "Have you ever been to an air show?" he asked.

"No, I haven't."

"There's a good one this weekend, up at Plattsburgh," he told her. "It'll have aerobatics, and historical machines on display. I don't know if it would interest you, but—"

"It might." Sally looked at her wineglass, idly turning it with her fingers.

There was something she wanted to ask; Carl recognized the signs. He had

learned that she never tackled anything directly. "What is it?"

"Why are you so interested in flying?" She looked up at him. "I haven't figured that out. You're not a pilot, or a mechanic. It isn't some Freudian escape-thing, flying away from your problems. God knows you're not a danger freak—"

"Maybe I am."

"Not the way other people are," Sally said. "Those models you have, and the things you talk about. You're fascinated by the old days of flying—"

"Nostalgia," he said, then shook his head. "No, I don't think it's nostalgia."

"What, then?"

"Maybe . . . back then, flying was dangerous, but it was *useful* danger. People got killed carrying air mail or shooting down Nazis or going into space, but it was for a *reason*. Important reasons. These days people throw away their lives for no good reason."

"That's always happened," Sally said. "People used to go over Niagara Falls in barrels, jog across Death Valley in the summer, try to cross the Pacific alone in rowboats—all sorts of crazy things. None of it made any sense."

"But they were oddballs," Carl said. "These days it's the rule. And it's not professional daredevils. The day I got infected I saw a mother step out into traffic with her little girl. She didn't even look. How many times have you seen something like that?"

"Too many times," she admitted.

"How do you feel when you see it?"

"Sick," she admitted, "but I always tell myself I'm being too sensitive, that I wouldn't take immortality for granted. I'd be more careful. But if I didn't have



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the allergy, I'd probably feel differently. After all, things that would kill either of us don't even inconvenience most people. They don't *need* to think about their health and safety the way we do."

Carl sighed. "I suppose I'd feel differently, too . . . but I still have the sense that something is wrong with people."

"Or that you'd be happier living in the past, when there was no such thing as immortality and we would have been normal." Sally sipped her wine. "I've thought the same thing, myself."

"You have?" Carl asked. She had gone to the heart of the matter, he saw. "What era would you want to live in?"

"None of them," she said, and smiled slightly. "I'm too literal-minded to make a good daydreamer. Like I'll picture myself back in the 1960s, listening to roll and rock music and riding a surfboard, and then I'll remember that the '60s had racism and all those wars. Or the 1890s, when things were peaceful, but they treated women like slaves. I'll stay in the present."

"A wise decision," Carl said, "considering that neither of us has a choice in the matter."

"No; we don't." She looked thoughtful, and then smiled. "Speaking of choices, I'd like to see an air show. It sounds interesting."

Carl smiled. "It's the least I can do for the woman who introduced me to Indian curry."

Carl was writing up an ace aircraft mechanic when Anna came into his cubicle. "The Poconos Air Fest sent two

press passes for this weekend," Anna said. "I think we ought to go."

"The Poconos Air Fest?" Carl scoffed. "I saw it once. It isn't worth a paragraph. They're looking for free press coverage."

"I know that. We don't have to stay long. Just take a few pictures and ask a few questions, and then we can have the weekend to ourselves."

"Sally and I already have plans."

"Break them," Anna said impatiently. "You shouldn't get too wrapped up in one woman. You need to spread yourself around."

"I don't need to—" Carl began.

"What's the problem?" Anna asked.

"Is she jealous? What she doesn't know can't hurt her."

"I'd know," Carl said patiently.

"You act like you're married to her, or something," Anna said.

"I've been thinking about that." That was a white lie, but even as Carl said it he realized there was some truth to it.

"Married," Anna said, and shook her head. "That always seems so pointless. Most marriages don't last, you know. And what's so special about this woman, anyway? You act like . . ." Anna looked pained. "I'll bet she's an ephemeral."

"She is," Carl said.

"That—that's *sick*."

Carl smiled at the malapropism. "No, that's how we *met*. Sally and I don't talk about it much—"

"I should think not!"

"—because we have better things to do with our time. Like going to a revival theater to see *Casablanca* in black and white on a big flatscreen, or arguing

about the McDill Amendment, or the *Times* jazz poll, or—or—a lot of things,” he concluded.

Her lips curled in a pout. “How quaint.”

“It’s enough for me,” he said, nettled.

“It won’t be enough for long.” Anna seated herself on the edge of his desk, a sinuous shape in a fuzzy sweater and stretch slacks. “I know how men are. You swear up and down you’re going to remain faithful, but a few months later you’re fooling around again. So why don’t you skip the fidelity stuff?”

“I don’t want to,” Carl said. He didn’t want to talk with Anna, but he felt curious. “If you’re so sure it won’t last, why don’t you wait a few months? You’re the one with all the time—”

“I don’t want to wait,” Anna said. “You’re making things impossible! I don’t know how much longer I can work with someone as unreasonable as you.”

I don’t know, either, Carl thought as he watched her leave his cubicle. Anna couldn’t have him fired over this—the board of directors would demand a better cause than her personal frustration—but looking for a new job might be a good idea.

She should know better, Carl thought as he walked home that evening. Anna was some forty years older than Carl. Those decades should have given her experience, maturity—or, he thought, *at least enough sense to know when to quit! A sense of proportion, something to tell her that indulging her morbid curiosity isn’t as important as destroying our working relationship.*

With an effort Carl put those thoughts from his mind. Know it or not, Anna

had raised a good point. Did he want to marry Sally? He’d known her less than a month, and the one thing they had in common was the allergy, and that didn’t make for a deep relationship.

On the other hand, the allergy hardly figured here. It was like meeting someone in a stuck elevator or in an interminable line in the tax assessor’s office: a starting point, and important only in that it opened the way to deeper things. *And it did just that,* Carl told himself. He had seen a great deal of her in the past month, and each meeting was as pleasant an event as the last. Carl began to catalogue everything he saw in Sally, then stopped himself with a sheepish grin. *Face it, boy, she’s wonderful and you want to marry her. Ask her tonight? Why not?*

Because, he thought, disputing himself almost automatically, *you want to make sure this is right for her as well. There’s no rush, not if you want to do this right.*

He came to her shop, and when he saw her he was glad he had decided to wait. Sally sat behind the counter, her shoulders slumped and dejection on her face. “What’s wrong?” Carl asked.

“I’m out of business,” she said. She fumbled with a paper and handed it to him. “The Health Board is shutting me down.”

“For God’s sake! Why?” Carl took the letter and read through it. The Health Board had decided that, as a REE-allergic and potential disease carrier, Sally posed an unacceptable threat to public health. She was ordered to close her business by the end of the month. *And so on and so forth,* Carl thought,

putting the letter down. "What are you going to do?" Carl asked her.

"I don't know," Sally said. "I can't afford to hire someone to run the shop for me. I don't want to sell out. I can't appeal the decision because the Board doesn't take appeals."

"So—"

"So I'm going to sue the bastards," she told him. "Only I don't know how to do that, or what I can charge them with, or even if I have a case."

"Have you talked with your lawyer about this?"

"No, I've been too busy feeling sorry for myself." Sally picked up the letter. "It's too late to call her now. How about dinner? I haven't eaten since this morning."

"Where should we go?" Carl asked. "That Indian place?"

"Yes, I'd like that." Sally closed up the shop and they went to her car. "There's something on your mind," she said, as they got in. "What is it?"

He started; she knew him well enough to read his face and moods. *Well, lady, I want to ask for your hand in marriage,* he thought, *but somehow this isn't the right time.* . . . "It's just the usual Mickey-Mouse stuff," he said.

"Bull."

Carl sighed. "Well, my editor keeps making passes at me."

Sally looked amused. "I thought men were supposed to enjoy that sort of thing."

"Not like this. She wants to bed an ephemeral. It may be her favorite fantasy but it isn't mine—and we don't even like one another."

"And she won't stop, is that it?"

"Yeah, that's it. She's making my

job impossible." He sighed. "You'd think she might show a little more sense."

"Why should she?" Sally asked. "She's going to outlive her mistakes."

"She shouldn't make mistakes like this," Carl said. "She's old enough to be a grandmother. She should have learned some sense."

"Maybe not," Sally said. "Maybe . . ."

"What?"

Sally looked at him. "Remember what it was like, being a kid? Taking stupid chances, breaking the rules, not thinking about consequences? When did you grow out of that?"

"I don't know, exactly," Carl said.

"When you realized you weren't immortal, that's when." Sally started the car and backed out of the parking stall. She drove to the parking lot entrance and waited for a break in the traffic. "There was a time when that happened to everyone. It was called growing up. People learned that some mistakes would kill them or maim them. Others would screw up their lives. You only got the one chance at life, and if you blew it, that was it. You'd be dead or crippled, or maybe you'd wind up old and filled with regrets at all the mistakes you couldn't correct."

The traffic thinned out and the car turned onto the road. "But how can you ruin your life now? Getting killed or maimed is hard work. If you botch your family life, if you make the wrong career decisions, you have plenty of time to start over—you can't end up as some poor, lonely codger in a retirement home, wishing you knew then what you know now. Nowadays there's nothing

to make people learn to think ahead. They don't get into that habit."

"Maybe, but—" He swore as a car cut in front of them. "Will you *watch the damned traffic?*"

She sniffed. "You walk when you get angry. I drive."

"Now you tell me!"

"Relax, Carl. *I'm* not the one who's driving like a maniac."

"I know, I know. Just watch the traffic, OK? You can't take on the Health Board if we get killed."

"Good point." She settled into silence.

Carl thought about what she'd said. *Sour grapes*, he told himself. *The two of us can't have immortality, so she's decided it's no damned good anyway.*

"I'm not sure I believe what you were saying," he said.

"No? Why not?"

"I can't believe that people have said 'Hey, I'm immortal, so I'll act like an irresponsible jackass.'"

"Aren't you the one who told me that's how they act these days? And I'm not saying it's a conscious decision." She wheeled the car around a corner. "It's like racism or sexism or any other ism. No one goes out and says, hey, I think it would be neat to acquire this attitude. It's something you pick up without realizing it, because it's all around you. People hear they're immortal, and they see that they're almost invulnerable to death and injury, and that does something to the way they think.

"And they're scared of us," she added savagely. "They can fool themselves into thinking that the odds won't catch up with them, but they know death

is still there. Ephemerals are living, breathing reminders of death."

"I've never seen you like this," Carl said.

"I know. It's the one real difference between us," Sally said. "When you get unhappy with the world, you dream about living in the past. I brood about what's wrong, and then I blow a fuse because there's not a stinking thing I can do to change it. I—" She bit off her words, pulled over to the side of the road and parked. "Carl, I don't want dinner. My insides are all knotted up. I need to be some place quiet."

"The Museum of Natural History is still open," he said, and then wondered if that was a good idea. It had been an almost free-associational response: *quiet place—museum*. The problem was that Sally didn't enjoy museums. Something else, then. "Radio City is playing *Gone with the Wind*."

"Yech."

"You don't like it?"

"I'm supposed to admire spoiled rotten slave owners?"

"Window shopping on Park Avenue?"

"I already have a window."

Carl sighed. Sally was in a contrary mood, and she would remain obstinate until she worked it out of her system. He made suggestions which she turned down, one after another, until she tired of it and decided she was ready for dinner. "But not curry," she said. "Let's try sushi. I've never had sushi."

"No sushi," Carl said, who had tried it once. "I want real food."

Sally made a face. "You're afraid to try anything new!"

"I don't have enough sense to be

afraid," he said. "If I did I wouldn't want to marry you."

Sally looked shocked, then started laughing.

The problem of Anna Jennings resolved itself a month after the wedding, when she accepted a position at a different magazine. One day she was telling Carl that he needed a little variety to keep his marriage from getting stale; the next day she was gone, her desk cleaned out before Carl entered the office.

"She didn't give any notice," Anthony Hudson, the magazine's manager, told Carl. "A while ago she told me that *Kick Boxing Illustrated* made her an offer she liked. And just yesterday she told me how happy she was here. Go figure."

"People have done this before," Carl said.

"I know, but it's always a pain. Anyway, I'm here to ask you if you can take over Jennings's position."

"You want me to be the editor?" Carl asked. It wasn't a surprise; he had the skills and experience, and he'd been on the staff longer than anyone else.

"It's only temporary," Hudson said quickly. "Just until we can bring in Jennings's replacement. He's a great guy, very talented, a real comer. He hit it off great with the board when they interviewed him."

Carl hoped he hid his disappointment. "Who is he? I mean, what's his background? What magazines has he edited?"

Hudson cleared his throat. "Well, he hasn't done any actual editing, aside from doing his high-school yearbook

last year, but the board of directors expects a lot from him." Hudson's voice dropped to a confiding pitch. "You were my first pick, but the board vetoed that. They were concerned that the work load might prove too much for someone with your health problems."

"I see," Carl said.

"I told them they were making a mistake but they wouldn't listen. Their strategy is to have you assist the new editor while he gets started. Give him the benefit of your experience."

"I see," Carl repeated, and wished that Hudson would leave the office. He spoke mechanically. "I'll look forward to meeting the new editor. I suppose I should get back to work now."

"Yes, by all means, the deadline for the next issue is noon tomorrow, isn't it?" And Hudson left.

"A high-school yearbook editor," Carl said to his word processor. Even by the standards of the publishing industry it was a bizarre decision—but not, he reflected, by the board's standards. The editor had to work directly with the board, and they wouldn't want to deal face-to-face with an ephemeral. *Children can't understand death, he thought. They can toy with it, have morbid fantasies about it, but facing the reality of it is something else. It's my bad luck to represent the reality.*

And they are children, he realized. The world was full of ageless children, the sort who saw more fun than cruelty in bull fights, who had to have their pleasure right now, who neither cared nor realized that their actions could hurt others—

Carl sat down, switched on the processor and erased his files. *I quit,* he

typed, and left those words on the screen.

"Maybe that wasn't the smartest move in the world," he told Sally that night. They were snuggled on the couch in their new apartment, speaking quietly while his hand stroked her hair. "But I couldn't stay there any longer. Pandering to thrill-seekers was bad enough, but getting passed over for a high-school kid—hell."

"Quitting was the right move," Sally told him. "It's better to leave the magazine now than to wait until a kid wrecks it."

"Yes—but I *still* can't believe the board did this!"

"Why not?" Sally asked. "They're overaged adolescents. They can get along with another adolescent more easily than they can with you, and hiring Mr. Popularity is more fun than making a sound business decision."

Carl nodded. "Well, tomorrow I'll start looking for a new job."

"No, tomorrow you and I are going down to City Hall. I've got a hearing with the Health Board."

"I thought they didn't grant hearings?"

"They don't," Sally said, "but my lawyer has been asking questions around City Hall. Political questions."

"Such as?"

Carl watched Sally smile. It was an unpleasant, vicious smile, as if she had just taken all her problems by the throat and was looking for the correct spot to sink her teeth. "Such as why we have a Health Board when you can't poison normal people or make them sick. Such as how much tax money gets spent on

a useless agency. Such as whether or not the Board shouldn't be shut down."

Carl felt pleased. "At least one of us is getting somewhere. What's the Board going to do tomorrow?"

"They'll probably offer to leave me alone if I'll back off. They have these cushy jobs where they do hardly anything, and they don't want to lose them." Her smile softened. "I may keep pushing. I promised you a bureaucrat-skin rug for a dowry and I don't mean to let you down. Now—"

The phone rang. Annoyed, Carl went into the bedroom to answer it, and found himself talking with his lawyer. "Good news, Mr. Heath," Gregg said. "Dr. Bailey is ready to settle."

"She is?" Carl felt a bit puzzled. He'd almost forgotten about his suit against Bailey.

"Yes, and it's a good offer. She can get you into a research project at the Mayo Clinic. They've got a cure for your allergy."

Carl felt dizzy. He sat down on the bed. "They do?"

"They do. It's experimental, something about suppressing histamine production—I don't understand this technical talk."

"A cure," Carl said. *A chance to live forever, a chance to fit in—Sally.* "Can you get two people into it?"

"Two people?" Gregg sounded surprised. "Impossible. Bailey can just afford to pay your costs. We're talking several million dollars. Why two people?"

"My wife," Carl said. "She's REE-allergic, too."

"Oh. Well, that's too bad, but there's nothing I can do. Grab what you can,

that's my advice. If you miss this chance you may never be able to afford it on your own, even if you can find a doctor to do it."

"I know," Carl said. Medical research, like medical practice, had almost evaporated. The Mayo Clinic might never refine its technique to an affordable point, might not even keep the cure available for long. "That's why I've got to include Sally now—"

"It can't be done. We can't milk Bailey for that much money."

"Tell Bailey it's both of us or nothing," Carl said. "If you can't arrange it for both of us, make a different settlement."

Gregg groaned in disgust. "Mr. Heath, I've spent a long day hammering out this deal and I'm in no mood for games. Be reasonable. No woman is worth what you're turning down."

"I think I'm being very reasonable," Carl said. He felt oddly calm. *Am I turn-*

ing down immortality for Sally? he wondered. *It feels like something else.* "Tell Bailey I'm not interested."

"And I'm not interested in having a lunatic for a client!" The phone slammed down.

It's not for Sally, Carl thought as he hung up. It wasn't a question of whether or not she was worth immortality; he couldn't make himself think of her in those terms. It was a question of Gregg, who could. *How long would it be until I started thinking like the other immortals?* he wondered. Carl tried to think that he could be different, but he knew himself too well for that. The need to fit in would take care of that despite his wishes.

"Carl?" Sally stood in the bedroom door. "Who was on the phone?"

"My lawyer," he said. "He was calling about Bailey."

"What did he have to say?"

Carl shook his head. "It was nothing important." ■

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The Alternate View

WHERE HAVE ALL THE HEROES GONE?

G. Harry Stine

On Wednesday, April 11, 1990, I had to take care of a very sad piece of business. I attended the memorial services for *Gemini/Apollo* astronaut Ronald E. Evans, the second *Apollo* astronaut to die of natural causes here on Earth.

I've referenced Ron Evans—no one ever called him "Ronald"—here several times. He had a wonderful sense of humor. During the past ten years as a resident of the Phoenix area, he gave many lectures on the subject of taking care of human physiological functions in weightlessness. The title of the talk was, "There Ain't No Graceful Way." Ron went quickly of a heart attack early on the morning of April 6, 1990. He was 56 years old.

The attendance at Ron's memorial services was impressive. The following astronauts showed up:

Edwin "Buzz" Aldrin, the second man to walk on the Moon.

Neil Armstrong, the first man to walk on the Moon.

Vance Brand, a member of the first international space mission. *Apollo-So-*

yuz, and the commander of the first operational space shuttle mission, STS-5.

Eugene Cernan, commander of *Apollo 17* and the last *Apollo* astronaut to walk on the surface of the Moon.

Richard Gordon, *Apollo* command module pilot of *Apollo 12*. (Ron was command module pilot for *Apollo 17*).

Dr. Robert Parker, astronaut and astronomer, first mission specialist on Spacelab that flew on space shuttle flight STS-9.

Harrison "Jack" Schmitt, astronaut, former senator from New Mexico, and the only geologist to set foot on the Moon thus far, as the lunar module pilot of *Apollo 17*, a mission which Ron also flew.

Donald "Deke" Slayton, one of the original *Mercury Seven* astronauts and one of the three American astronauts of the *Apollo-Soyuz* mission.

General Thomas Stafford, pilot of *Gemini 6*, commander of *Gemini 9*, commander of *Apollo 10*, and American commander of the *Apollo-Soyuz* mission.

These men were heroes of the Space Age and they came to honor a fallen Space Age hero. I don't believe there has been such a gathering of eagles since the tragic *Apollo 1* services in Arlington National Cemetery.

Or were they really the first heroes of the Space Age?

As I was driving home from the services, I got to thinking about that. In chatting with space artist Bob McCall, who was there, I remarked that this was probably the first of many such services yet to come, then recalled that there had been those before the astronauts that were space heroes to me.

I believe we're starting to see the departure of the second generation of space heroes.

The first generation is nearly gone. At least, the ones whose names were widely known—Dr. Wernher von Braun, Dr. Hermann Oberth, Robert A. Heinlein, Dr. Willy Ley, people whose written works and whose charismatic leadership led the first generation of people toward space careers. Yes, a few of the first generation are still here, but their names are not well known.

The second generation of space heroes are the people who actually did what the first generation said could be done, and who actually flew in space and walked on the Moon. They are the American astronauts and Soviet cosmonauts who risked their lives riding atop hazardous long-range artillery shells because that was the only way to get to space. Now the second generation has started to leave us.

Where are the new space heroes?

Where are the von Brauns of today's Space Age?

Answer: Somewhere buried in the stifling, overwhelming bureaucracy that has been built on the foundations of the conquest of space or still struggling to make a success of trying to do it right this time around.

Am I NASA-bashing? You bet I am, and I am one of the original NASA-bashers! While I was CBS-TV news science advisor during the *Apollo* missions, I heard it said that NASA was the only organization that could take something as grand and exciting as the first flights to the Moon and make it boring. If we thought it was bad twenty years ago, it's been compounded since then.

Where Have All the Heroes Gone?

This has not been the fault of many very fine individuals in NASA whom I know, but of the system that has been built up on political expediency and has grown like any other bureaucracy. Our national space program is no longer one of boldly going where no one has gone before. It is one in which the bureaucrats and politicians are not willing to take any risk of any sort whatsoever. Their apparent policy is that science and engineering are exact and predictable; therefore, no failures can be tolerated. The experiment must always work. The test must always be successful. God help the bureaucratic engineer who gives a thumbs-up to a test or mission in which someone is killed!

That is why it takes anywhere from 10,000 to 50,000 people and \$250 million to \$470 million (pick your numbers because no one really knows for sure or is telling if they do) to launch a single space shuttle mission. This is why the ancient and stupid argument about manned space flight is still an issue in spite of *Mercury*, *Gemini*, *Apollo*, *Sky-lab*, *Salyut*, *Mir*, and the space shuttle. Put people into the system and predictability is no longer capable of being number-crunched on a Cray and a failure may mean the loss of human lives.

This is not the way to run a space program and has about the same success ratio and cost-benefit as when the United States Post Office tried to fly the air mail before the passage of the Kelly Act in 1925. (If you don't know about that, check it out. History repeats itself only because we didn't pay attention the first time.)

Can you think of some recent heroes in the aerospace area? Certainly not the

faceless and quickly forgotten USAF crew that recently flew the retiring SR-71 Blackbird coast-to-coast in a few minutes more than an hour; they were old hands at doing such a thing. Not the flight crew of TWA Flight 735 on 17 April 1990; they're one of thousands of flight crews all over the world doing today what was impossible fifty years ago. Some recent heroes who come to mind are Dick Rutan and Jeanna Yeager who took a marginally stable, nearly overweight small airplane and flew it completely around the world on a single tank of fuel, risking their lives on several occasions during the flight and enduring the sort of hardships most of us never have to face. How about the crew of Aloha Airlines who brought back a Boeing 737 whose fuselage was nearly blown away? How about the crew of the United Airlines DC-10 who managed to get it back to the ground at Sioux City, Iowa, albeit in pieces, without losing everyone aboard?

Why are the astronauts no longer great heroes? Why are the SR-71 pilots not great heroes? Why are the airliner flight crews not heroes?

Why were Rutan, Yeager, and the Aloha and United Airlines crews heroes? Answer: They put it all on the line, faced and evaluated great risks, and basically told the Universe they were humans who wouldn't meekly knuckle under, who would try and continue to try until they could no longer try.

I imagine such people will be involved in some future NASA space shuttle flight. But my guess is that NASA will not permit those heroes to be heroes. To do so would be to deny the infallibility of science, engineering, and NASA's program. They will whine

about the lost astronauts instead and then search to find someone to blame.

We had a recent example of this sort of nonsense. NASA flew some tomato seeds on the Long Duration Exposure Facility (LDEF) which was recovered from space in 1990. Packets of tomato seeds were distributed to elementary and secondary schools around the country. Then someone speculated that the "radiations of outer space might have mutated the seeds and created toxic tomatoes." In a panic lest science fiction again become science fact with the "Attack of the Killer Tomatoes," NASA quickly recalled all the seeds. Ye Gods, if they wanted to teach kids something about science, they should have allowed the tomato plants to germinate and bear fruit with the caveat that the tomatoes should be carefully tested on lab mice or hamsters. The kids might have learned something about science and about the fact that science and technology are indeed dangerous endeavors that require care. (I'm going to catch hell again for saying the above, but I am weary of science being watered-down to "safe" experiments. Cripes, if I'd been restricted to "safe" experiments and chemicals, I wouldn't have learned a lot about science fifty years ago. Like thousands of others, then and now, I'm lucky to have all fingers and other appendages.)

We're not doing our best to kill off the potential heroes. We're doing our best to keep them from becoming heroes and to force them to live safe and utterly boring lives. I can't understand why some educators (read: pedagogues) bewail the lack of interest, motivation, and learning among their students; they themselves have created the situation.

Where have all the heroes gone? I think I know.

When will the new heroes become known? I can't predict who and what and where and when.

But unless you and you and especially you start thinking about this and begin to realize that if we are going to have a future we're going to have to have heroes, we will have neither.

And that will be too bad.

But I have hopes, and here's why:

Back in 1987, a man named M. Stuart Millar, who'd made a fortune in the electronics business, bought Piper Aircraft Corporation. He paid cash for it and he owned it outright. Millar wanted a challenge. He wanted to build small general aviation airplanes. He loves airplanes. (So do I.) He told the world that if they wanted to lay a heavy product

liability suit on Piper Aircraft, they'd just end up with an airplane company, not a multi-million-dollar settlement.

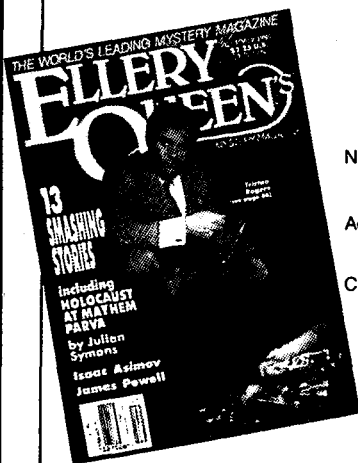
In a recent interview, Millar said:

"One of the very great changes in the last 50 years is the growth of an idea that says death is unnatural; it must be somebody's fault. It wasn't always that way. People accepted and realized that life is a gamble. Maybe you will live a long time, maybe you won't. We more easily accepted the idea that to live, to experience life, was to accept danger. . . . It isn't a question of whether or not you will die. The question is whether you will die having done nothing or done something."

Thank you, Stuart Millar, not only for keeping Piper alive but for telling us what heroism is all about.

Ron Evans knew that. ■

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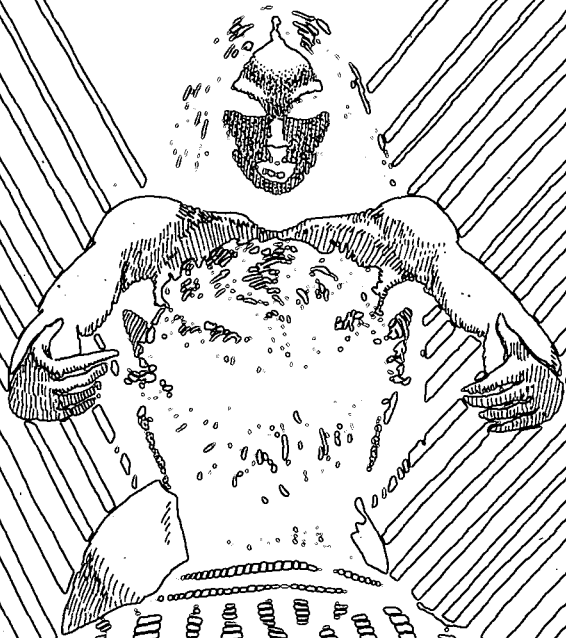
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JOHNNIE WONG'S TANTAGRAPHS

Brian C. Coad

What becomes of an idea can depend
on its intrinsic merits, sweeping historical
forces—or much smaller, more personal things.

Janet Aulisio



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Like any other great Corporation, G.B.I. (General Business, Inc., or, more colloquially, Great Big Industries) exists to make money. It's our primary duty, we dedicated servants of the Company, to suppress any personal considerations that interfere, and see that happens. Once in a while a servant screws up (like me with the Johnnie Wong patent). Money that should have been made, isn't.

What reminds me of my screwup, and has made me feel guilty, is a paragraph in today's *Times* saying one of Johnnie Wong's tantaglyphs has just sold for seventeen million dollars. If I'd been a bit smarter, or more courageous a few years back, a lot of that money would have landed in our Corporate coffers.

Thoroughly uncomfortable (you see what a hold Mother Company has on me!), I tell myself it's just plain stupid to worry about what might have been if I'd done something different. Suppose I'd been cleverer, or a bit more dedicated, or whatever it took. It's just as likely Johnnie would then have stayed on the payroll, would have focused on his technical work, and never have become anything more than a dabbling amateur artist. Then there wouldn't have been any seventeen million dollars for G.B.I. to claim a share in. Perhaps, I tell myself to soothe my conscience, my lack of assertiveness at the time did mankind a service. Maybe I played an important part in the growth of a great artist.

The pesky guilt feeling persists. I run my eye over the rest of the *Times* paragraph. "The high-priced tantaglyph is one of Wong's early works, created dur-

ing that tragic phase of the artist's life known as his Purple Pity Period." Another feeling, almost as unpleasant, comes up. Frustration. Back then, when I had a chance to interface with Wong to G.B.I.'s benefit, I was too much into the business I was paid to do to pay much attention to the peculiar human interactions that were going on. Oh, I couldn't help noticing they existed. But I suppressed my natural curiosity, then and later, and never investigated, except superficially. It's a sign of advancing age, I suppose, when we want to understand everything, and feel frustrated if we can't. Potted biographies of Wong I've read over the years haven't helped. Precisely what happened within the triangle, Johnnie Wong-Joelani Lauanui-Jeffrey Grieves I've never discovered, though, holding the *Times* up in front of me, I am sure it had a lot to do with the artist's "Purple Pity Period."

I try to persuade myself that it also had a lot to do with my own part in the affair. What went wrong back at Johnnie Wong's patent time almost surely was a result of good, old-fashioned, complex human nature, not of any shortcomings of mine.

But I can't convince myself of that. Maybe my mood will improve if I write down what I do know of the affair. Worth a try anyway.

I've the honor to serve G.B.I. as corporate patent attorney, and have done so for so long, it's embarrassing to think of it. It's all of fifteen years ago that Johnnie Wong's invention disclosure reached my desk. In mid-winter, I remember. I was delighted to get it.

Wong, whom I'd never met, was then a junior engineer in the capacitor section of Electronics Division. Electronics is on the West Coast, thirty miles south of San Francisco. During any ice-bound winter in Connecticut it's pleasant to hear from an inventor in a warmer clime, not for the surrogate warmth, but because any attorney (such as myself) with a strong sense of duty, recognizes that; at whatever personal inconvenience, he really should visit and talk with an inventor before writing up his patent application. Particularly if he's located near San Francisco, a favorite city of mine.

Unfortunately, in those days of tight money (when isn't money tight?) one disclosure did not a trip West make. I remember feeling restless for several weeks before a couple more came in from other Electronics inventors, and I was able to justify the trip. By then it was April, skunk cabbage was poking up green in the winter-naked woods, and our Eastern climate had become almost bearable.

Miss Lee, my secretary, knows my preferences. She always books me into a San Francisco hotel, where I arrive in late afternoon, too late to do any business, and can enjoy dinner at the Wharf, watching the sun set beyond the Golden Gate. On the Johnnie Wong occasion, for some reason or other—maybe she was sick, or on vacation—I was booked into a motel in Palo Alto, not far from Electronics. I don't remember why I didn't get it changed, particularly as my flight brought me in too late to get any work done that day. I had my rental car, and, after checking in at the motel, toyed with the idea of driving up to eat

in San Francisco, but then it came on to rain, and I didn't. Instead, I found a local restaurant. Ate there. Noticed in the entrance a poster for an art exhibition at the Town Hall. Drove over to the Town Hall, to see if the local artists had anything to show me.

It was an amateur show, nothing particularly exciting, might just as well have been back home, or in any other modest sized American town. There was only one outstanding picture. And that one really caught my attention.

In those days Jeffrey Grieves, one corner of the triangle I've mentioned, was president of Electronics Division. He was famous wherever the Corporate grapevine whispered, not so much for any attribute of his own, but for those of his remarkable secretary, Jo Lauanui, the second corner.

Jo was a friend of mine, to the extent that an already middle-aged patent attorney is permitted to be friendly with a golden complexioned young Hawaiian girl with smoky brown eyes. Influenced by Michener's *Hawaii*, I always called her "Joelani," which set her smiling eyes dancing.

(I should note, in defense against vulgar individuals who might suspect me of ulterior motives, that if Joelani had been a hard-faced Caucasian with warts and a rasping tongue, as are some of those who fit her job description, I'd still have tried to make a friend of her. Secretaries are a good source of information, and in a great corporation you never know what you may need to know in order to protect your ass.)

What our relationship amounted to, Joelani would put out daughterly pheromones, and I'd respond with fatherly

ones. I'd heard wicked stories about her on the grapevine, which I ignored. The real target of all that gossip was, in any case, Grieves, her boss, who'd broken one of the unwritten rules—HIGH LEVEL PEOPLE IN G.B.I. DO NOT SURROUND THEMSELVES WITH BEAUTIFUL SUBORDINATES. I respected, even enjoyed, Joelani, but it was from an appropriate distance. We got along pretty well.

Back to the Palo Alto Town Hall art exhibition. The picture I discovered there at the center of it had a bright red first prize rosette attached to it. It was a portrait, in oils, of my respected friend, Joelani. Full length. Large—almost life size. Full frontal nude.

It was a magnificent piece of work. I'm no connoisseur of art, but its quality took my breath away. The artist had caught the exact golden hue of her skin, the perfect form of her, the innocence of her smiling eyes, which, nevertheless, had a secret power in them—something of Pele, the Hawaiian volcano goddess?—I'd not noticed in the live girl herself. The painted girl had her arms outstretched, inviting embraces. If at that moment she'd suddenly come to life, I would have fallen right into them.

As it was, I stood staring for two or three minutes before I saw she was standing over some sort of apparatus which, when I looked closer, I recognized as a silicon crystal pulling furnace. It occurred to me then that she wasn't really in an embracing posture. She was blessing the furnace.

I looked a bit closer, and discovered the painting had a title. GODDESS OF

THE CZOCKROLSKI PROCESS. The artist, obviously someone technically knowledgeable, had created a goddess all right. He'd signed his name just below one of her naked feet. Johnnie Wong.

For some time I stayed there in the presence of the goddess, enjoying every detail of her. If she'd been for sale, I'd surely have bought her. Then—and this probably had something to do with Johnnie Wong's invention disclosure—it occurred to me that a man who had that picture hanging in his house would be in much the same position, though deprived of a different kind of nourishment, as Tantalus, the Greek geezer who was stuck up to his neck in water under fruit trees. The one who couldn't reach, with his lips, the water to drink, nor, with his hands, the fruit to eat. Tantalized.

Then I was sort of pleased I couldn't buy her.

A guard came over to tell me the exhibition was due to close. Would I please head towards the exit? I headed for the exit, went back to my motel, and dreamed.

Next morning, I was at Electronics, alert and lively, before eight o'clock. I won't admit to being influenced by the painting I'd seen the previous evening, arriving so early, but I won't deny that I might have been. Unconsciously, of course. Reception—the plump girl at the desk knew me well enough—sent me right up to Grieves's office. Surprise, surprise! Grieves hadn't come in yet, and Joelani was alone at her desk in the outer office.

Joelani motioned me to take a seat in

one of the plush armchairs provided for visitors, yellow upholstery, I remember, and went on reading a document she was holding. This was unusual. Usually she had a wide-mouthed grin of welcome, a few polite words, and a pretty, girlish wriggle for me when I called her Joelani. This time, none of that.

I'm afraid I was a rude patent attorney. I plonked myself down on the chair, and sat staring at her, thinking what a finer thing this real-life goddess is even than that magnificent painting. She seemed nervous, fretful, as she turned the pages of the document in her hand. I wondered if I could do anything to help, was about to offer, when the telephone rang. She answered it, whispered into it a few velvety syllables, turned to me, and said: "Mr. Grieves will be late. Would you care, he asks, to meet with your inventors, and see him later?"

"Surely."

She murmured into the telephone again, cradled it, looked at me. I fancied I saw flash in her eyes that Pele strength I'd detected in her portrait, but if I did, it was gone in an instant.

I reached into my briefcase, which I had open. Brought out the disclosures I was there to work on. Conveniently, Johnnie Wong's was on top. I decided to visit him first. Put the rest back in the briefcase.

I stood. I asked Joelani for directions to Dr. Wong's laboratory. (Johnnie had a Ph.D.)

"Certainly, Mr. Mason." She blushed as she spoke. Words lack power to describe the beauty of that rich, rosy color flowing across her perfect features. It

was a real privilege to be permitted to see it. Just the same, I wondered why it happened. I'd never thought of her as the blushing type. Anything to do with her portrait? Was it, perhaps, unauthorized? Did she think I'd put out a message on the Corporate grapevine, describing it? Surely she knew I'd never do that!

That was the kind of middle-aged confusion that raced through my mind, under Miss Lauanui's mesmerizing influence, as that young lady reached into a desk drawer and brought out a sketch of Electronic Division's lay-out. Her hand definitely trembled as, still blushing, she traced the path I had to take to Johnnie Wong's laboratory.

I left my briefcase with her in her office. It was only as I walked away that I realized that her portrait had nothing to do with her blushing. She could have no idea I'd seen it.

Johnnie Wong I found alone in a cubby hole filled with chemical apparatus, a few power supplies, and such, annexed to the main R. and D. lab. He was trim, lean, average height, with that Western smile on his Chinese features which you only see on third- or fourth-generation Chinese Americans. Age maybe twenty-six. Nonconformist. Instead of the regulation corporate white shirt, he wore a California style thing in red plaid, with frills. No tie. His straight black hair was uncommonly long.

I introduced myself. Told him why I was there. He said he already knew. Miss Lauanui (if there was any overtone of feeling in the way he said her name, I didn't catch it) had called down. He

suggested we go sit in his office, but then changed his mind. "The equipment's set up right here. Why don't I just show you how the invention works?"

To that, I agreed readily enough.

Wong's invention comprised a means of creating pictures by anodizing tantalum. Tantalum is a rare metal, dark, almost purplish in color, heavy, given its name because it is so tantalizing when you try to dissolve it in acid or any other solvent. The chief industrial application of the metal—and we use a lot of it—is to make capacitors, little store-houses for electrons, which crop up in nearly every electronic circuit. Its oxide, which can easily be formed on the metal's surface by making it the anode of a cell, and passing a current, has remarkable dielectric properties, hence the capacitor application. By now, most capacitors are made of porous tantalum slugs pressed from powder, but back then there was a lot of interest in using rolled tantalum foil—it's a very ductile metal.

So much for the background. Wong was working on capacitor foil. When the foil is anodized, thin films of oxide formed on the surface display a remarkable range of metallic colors—in fact, the entire color spectrum—by light interference effects. Any particular color can be produced by selection of the correct anodizing voltage. The oxide films are stable and permanent. Unless mechanically damaged, it is possible they'll last for millions of years.

The formation of anodized films was the basis of Johnnie Wong's patent disclosure, and was not new, having been known to those who work in the field

for a very long time. His invention was to apply the phenomenon to produce works of art. He first coated the tantalum with an impervious barrier—"Most anything will do," he said, "I've even used butter"—on which he scratched part of the design he wanted to create, starting with the areas to be colored by the highest voltage. Anodize. Scratch some more. Anodize at the next lowest voltage. And so forth.

"I like best of all to do it pixel by pixel, so to speak," he told me, "with a fine probe under a microscope. You get beautiful Impressionist effects." As he talked, he scratched a rough profile of yours truly on one of his prepared sheets of tantalum. "You can work with an infinite range of colors. A difference of 0.01 in the anodizing voltage can give a detectable change of color in some parts of the spectrum. And I don't know what other color medium is likely to last for millions of years."

Then he anodized my profile. Made me a brilliant scarlet, washed off the barrier layer, and gave me an emerald green background. He held it up, said: "Pretty, pretty. Not great art, but to create great art the artist has to suffer, I'm told. It's good enough to give you the idea of the thing." He handed me the tantalum sheet. I still have it stored away somewhere in my attic. Will have to dig it out. Must be worth a lot of money.

After that, we went to his office, and went over the disclosure line by line. He hadn't missed a thing. I was sure his invention was patentable. Unless we drew a real grouchy examiner on a day of personal catastrophe, I didn't doubt

the application would sail right through the patent office.

When we were done, I congratulated Johnnie Wong, and wondered if I should say anything concerning that other artistic endeavor of his I'd seen.

Luckily, while a foolish remark was on the tip of my tongue, his telephone rang. It was Joelani, to say Mr. Grieves had arrived. Would I come up?

Again, Johnnie showed no particular reaction that I could see to this contact with his Czockrolski Process Goddess. Perhaps in his art as in his technical work, he was a true professional, free of personal involvement. I gathered my papers together, and left with an extremely good impression of the young man.

Grieves was in Joelani's area waiting for me. He had bushy eyebrows and a bulging forehead. Probably his eyebrows weren't really in bristling motion, but I sensed a lot of tension between him and his secretary the moment I came in. Joelani was saying something, stopped as soon as she saw me, and gave me a half smile that was almost a frown. Her eyes flashed again as she passed me the briefcase I'd left with her.

Grieves glared at her, growled something unintelligible, stomped to his open office door and gestured for me to get inside there in a hurry. Why did I get the impression, somehow, that he was a bit afraid of her? I hustled into his spacious quarters. He didn't offer to shake my hand, invite me to take a seat, or anything. Just went around behind his enormous desk, and flopped into his executive's chair.

Fortunately I'm pretty used to divi-

sion presidents and their tantrums. I'm not afraid of them, even though, since they pay the bills, they have the final say-so concerning what I do, and don't do. On my own initiative, I pulled up a chair, settled myself, and met his eye across the desk.

"This Wong disclosure," he said. "I hear you've been wasting time on it. I want that one scrapped. Forget it ever came up."

I still had the Wong file in my hand, waved it at him, hoping I'd be seen as intimidating. "Jeffrey," I said (we're all friends in G.B.I.—always use first names), "you know I can't do that. Once a disclosure reaches my office, as the policies spell out pretty clearly, we have to investigate. If it's patentable, we either have to file, or we have to tell the inventor we're not filing, and let the rights revert to him. That's not only policy. In judges' decisions lately, it's come pretty close to being the law."

"I don't care. I don't want you doing a damn thing for that upstart young whippersnapper. Besides, he's been doing all this stuff on company time, quite without any authorization. God knows how much he's cost us."

"Not much, I should think. I went down and saw what he's doing. It's a clever idea, one of those inventions that might lead anywhere."

"Are you arguing with me, Wally Mason?" His voice threatened, his bulging forehead sort of bubbled as angry shadows rolled over it.

"Not at all, Jeffrey Grieves. Just telling you what the facts are."

He glared at me, took a couple of deep breaths, and forced himself to calm down. "Anyway, Wally," he said,

“that’s one damn patent I will not approve to be filed. I’m within my rights there, right?”

“Oh, certainly. Shall we go through the other disclosures, see where we stand with them?”

There were no problems with the other disclosures, all of which, by the way, ultimately ended up as patents. We didn’t take long. When we were through, Grieves called on his intercom to get Joelani to bring in some coffee. She didn’t respond, was obviously not at her desk. “Damned insubordinate women, think they run the place, and everybody’s life.” Grieves said. A peculiar remark, coming from a divisional president. I was going to say the beautiful ones can get away with anything, but thought better of it.

I visited the other inventors, completed my business, and went back to Grieves’s office to bid him farewell. Joelani was again not at her desk. Before I left Grieves, I tried tentatively to bring up the Wong disclosure again. My head was bitten off.

Metaphorically decapitated, I got my car and drove rather hurriedly up to the airport and caught an early flight home, not realizing that these many years later I’d be obliged to feel guilty for not working harder on Grieves.

In due time, I notified Wong officially that we were not going to patent his invention, and that the rights therefore reverted to him. The rest, as they say, is history. He parlayed his new art form, which he christened tantaglyphs, into an international reputation and several tens of millions of dollars—maybe by now hundreds of millions.

The story of his success has been written up in dozens of magazines. It is straightforward. A young man with an idea and a lot of talent, who quit a boring engineering job to create masterpieces. Nothing subtle about it. Either by design or through indolence, the journalists missed the subtleties.

I should have missed them, too, had it not been for whispered rumors transmitted along the Corporate grapevine. Even so, I only picked up bits of the story. More tantalization.

Some weeks after my visit to Electronics, the grapevine announced that Johnnie Wong had resigned. There was a suggestion he’d been fired for insubordination, but I checked and he had legitimately resigned. I wasn’t surprised, wished him luck under my breath, and, busy with other matters, thought no more of it.

The next grapevine item of interest stated that a secretary at Electronics, Jo Lauanui, was suing her boss for sexual harassment. That is the kind of news that only the grapevine carries. Our Corporate masters will go to extreme lengths to suppress such gossip, and protect the pure images of their higher executives.

Though the sexual harassment story seemed authentic, I tended, on the whole, to discount it. I remembered the Tantalus feeling I’d felt when I was examining the Joelani painting, thought how Jeffrey Grieves must have suffered, day by day, in the presence not of mere daubs on canvas, but of the flesh and blood woman. An indiscretion committed by a man subjected to that level of

frustration could be understood, if not forgiven.

Grieves kept his job, so I don't suppose the case came to court. If it was settled out of court, as the grapevine said, I never heard the terms of the settlement. It was certainly true that the next time I had occasion to call Grieves's office, the secretarial voice that answered my call was not Joelani's.

The grapevine burped and glitched some more. Johnnie Wong, it said, had become a starving artist. Jo Lauanui had not only moved in with him in his studio—if you could call the tar-paper shack in which they lived a studio—but was supporting him on her settlement from Jeffrey Grieves. And, a malicious addendum which at the time I totally rejected, was *controlling and directing* his life.

From then on, the grapevine had nothing more to say concerning Johnnie Wong.

For some reason, more than a year passed before duty took me back once more to Electronics Division. In the interim, I'd scarcely spared a thought for Johnnie Wong. Or for Joelani. Occasionally, in a philosophical moment, I did reflect on the frustrating nature of a patent attorney's life, the way he gets to be superficially acquainted with many interesting people, but has to focus in on the business in hand, and never really gets to know them. But that, in self-pitying moments, was a recurring theme of mine.

As usual, I arrived at Electronics on the stroke of eight o'clock. This time Jeffrey Grieves was already in his office, waiting for me. The grey-haired

lady in tailored suit who escorted me seemed pure and immaculate enough to be lady-in-waiting to a virgin Queen. Grieves had trimmed his eyebrows, and there was not the trace of a thundercloud on his bulging forehead.

His first words, as he shook my hand, were: "Could you stay over tonight, Wally? My wife and I would very much like to have you come for dinner. Jo—you used to call here Joelani, didn't you?—has always thought highly of you, and would much like to see you again."

We got through our business, which isn't relevant here, and that evening I had dinner with them. Joelani was her usual charming self, seemed radiantly happy. Although I couldn't detect any Pele flash in her eye, she was clearly in charge of the marriage, and everything else. Grieves, rushing to fill her water glass, carry out dirty plates, and so forth, seemed to like it that way. He was mellower than any divisional president I'd ever encountered up until then.

Johnnie Wong's name never came up in the conversation. I felt it would be impolite to mention him.

During the trip back to Connecticut, having nothing better to do, I permitted myself to idly review what I knew of the Grieves-Lauanui-Wong affair. Focused my legal mind on it. Pretended I was a prosecuting attorney developing the facts in a criminal case, a favorite fantasy of mine. (Remember, at that time Wong was not a famous artist!) What weight should I give to the grapevine stories? Had Joelani—better call her J, to maintain objectivity—in fact supported Wong, W, with a settlement

from Grieves, G? Had J and W in fact set up housekeeping together? Then why had she dumped W? Why had she married G? Most mysterious of all, why were they so happy? So apparently happy? Were they really as they appeared?

I couldn't assemble enough evidence to bring a coherent case to trial. Felt frustrated. Told myself this is typical of the tribulations a patent attorney has to suffer through. Ordered a Martini. Watched the sun set gaudily in the west as we flew eastward.

A few months later Grieves departed G.B.I. for greener pastures. Started his own corporation, I believe. I never heard how it came out, nor have I heard from him or Joelani in all the intervening years. Would probably never have thought of them again, had it not been for the recurring publicity relating to Johnnie Wong.

Now this *Times* article. Seventeen million dollars for a tantagraph from the artist's Purple Pity Period. Guilt feelings generated in a humble patent attorney who long ago failed to assert himself as he should have done for the benefit of Mother Company. Frustrations resurrected in one who never had

a chance to assemble information sufficient to know what was going on at a personal level between the people concerned. The typical emotional hazards that go with my job.

Suddenly I remember Joelani's Pele-flashing eyes. I remember Grieves's attitude of almost servile concern for her when they entertained me at dinner.

Can it be that there was enough of a goddess in Joelani to have engineered the whole affair? Had she deliberately engineered a Pity Period for Johnnie Wong tragic enough to stimulate him to produce great art? (But if that was her plan from the beginning, why, going back a bit, had she blushed?) Had she deliberately so tantalized Grieves that he gave short shrift to a visiting patent attorney, preventing him from doing his duty, while ensuring the patent rights reverted to Wong? Had she manipulated everyone—myself included—into doing just what she wanted?

She may have.

And if it was a goddess I'd had to contend with back then, what earthly use is it to go on berating myself and feeling guilty now, fifteen years later?

I guess it's the kind of person I am. I go on doing it. ■

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Nicholas Jainschigg

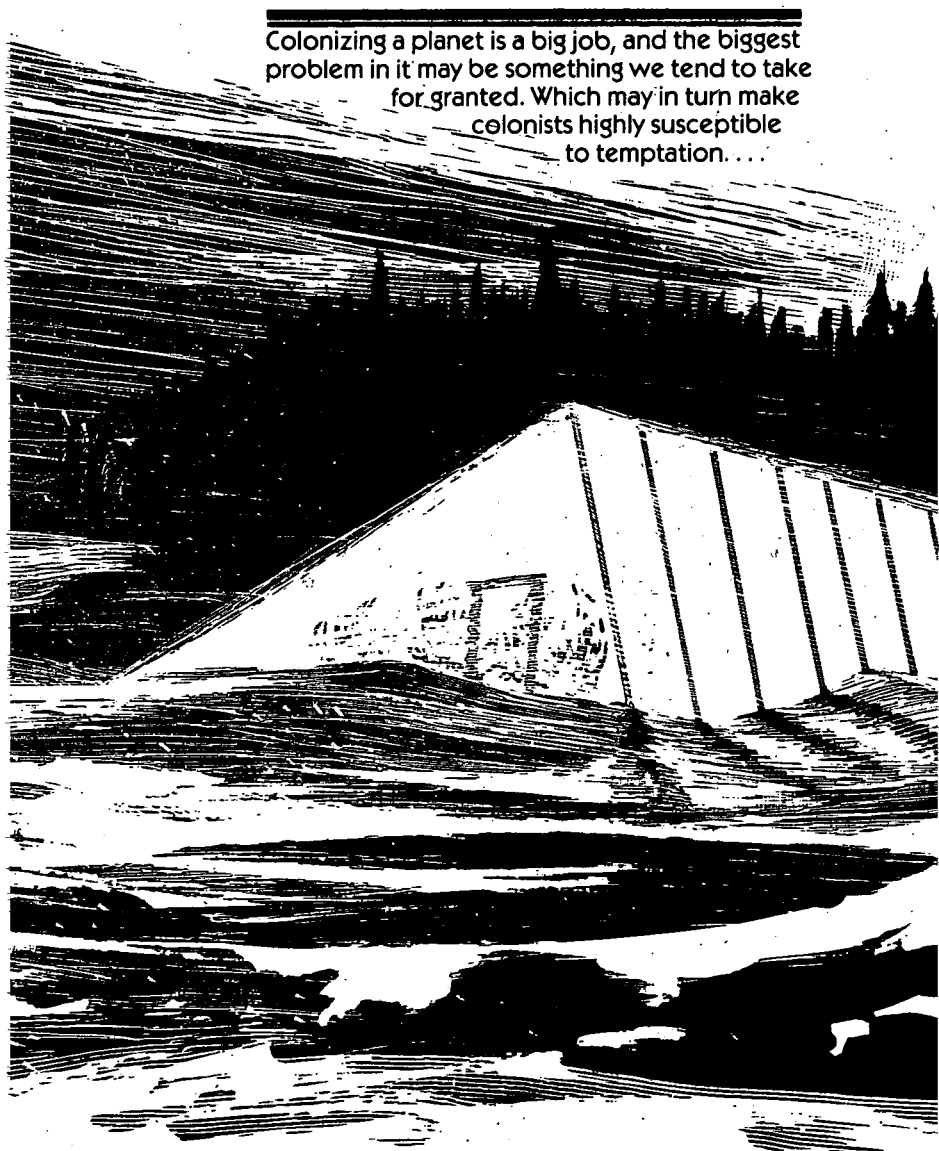


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DEN OF FOXES

Daniel Hatch

Colonizing a planet is a big job, and the biggest problem in it may be something we tend to take for granted. Which may in turn make colonists highly susceptible to temptation. . . .



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ONE

Lin Palmer watched the first big wet flakes of snow drift down out of a yellow sky and felt the muscles in his gut tighten up. With a half meter of snow already on the ground, this was the last thing he wanted to see. The only thing that could make it worse would be another blast of cold like the one that followed last week's storm.

He bundled his parka around his face and neck and trudged along the well-trampled path to the greenhouse.

Despite his fears, there wasn't much he could complain about. After all, he knew just what he was getting into when he volunteered for the Asgard breakthrough colony. You had to expect snow on a world in the grip of an ice age, but you didn't have to like it.

Of course, Lin's real problems didn't come from the snow, which was no worse than a winter back in Caribou. It just made all the other things worse.

Like getting the greenhouse going . . .

He paused at the end of the path and unsealed the sheet of plastic that formed the wall of the building—there was no door on the place. Once inside, he checked the thermostat and the level in the water tank. Both were within safe limits.

He looked down the length of the greenhouse in a quick visual inspection of the structure. The place was three meters wide and thirty meters long. It was high on the north side and low on the south to take advantage of solar warming. The construction was simple enough, sheet plastic over wooden cross-ribs, but it had taken all the capital budget he was allowed by the den and

most of his personal labor budget. Even now it ate up the largest chunk of his time—even with Asgard's overlong days. The tiny fusion pack in the corner could pump enough heat for ten times as much space, but only if he could afford to build it.

He had planted four rows deep in native soil under the plastic. The mix included some Incan strains gene-adapted for Asgard's shorter year, a native fruit-bearing species, and some old-fashioned Maine potatoes. So far, the best performers were the pepina dulce. He'd picked them because he liked the taste—sort of like a honeydew melon—and because they packed a lot of vitamin C. The potatoes were coming up strong, as was something the scouts called beastfruit that grew on a long vine. South Valley had good soil—mostly loess sediments blown in long ago from glacial outwash plains.

But good soil or not, the cherimoyas weren't doing so great. They looked yellow and pale. The scouts had warned them about that, said they need stronger sunlight.

Lin walked slowly down the space between the rows, checking each cross-rib in turn. The plastic was designed to transfer enough of the heat inside to the snow as it fell. The meltwater ran down to fill the tank, and then was diverted out a drain hose when the tank was full. But he still liked to check the load on the wooden braces. He was afraid that if one went, the rest would follow like the teeth on a zipper.

A scuttling sound among the pepinas stopped him halfway down the row.

Damn it, had a lizard gotten in here?

He peered into the leafy tangle on the ground and waited. The noise came again. He pinpointed it now and turned his eyes toward the potatoes.

There it was. Not a lizard, but a furry grey creature the size and shape of a golf ball. Bytes, they called them. This one had four short pink stick legs, a pink nose, and two black eyes. It scurried under a leaf, then stopped and looked up at Lin boldly.

For a moment, Lin felt as if the byte was regarding him with the same surprised amusement that he felt towards it.

According to the scouts, bytes—and their little cousins, bits—were the only mammaloid life on Asgard. The planet was dominated by the fuzzasaurs, most of which had already migrated south or gone into hibernation for the winter. Bytes, apparently, did not hibernate. Or if they did, they woke up during the occasional thaw. This one must have, anyway.

"You're cute, but I'm afraid you'll have to go. You look like you need a lot of food to keep you going in this weather."

Lin shooed the byte away, making a note to double check the ground seals and to look for its nest. Was there an easy way to make a byte trap? Maybe one that wouldn't hurt the little buggers? After all, mammals should stick together.

After two hours of tending the plantings, patching loose plastic and pumping water, Lin bundled up his parka and squeezed through the greenhouse wall. The snow was blowing furiously now, and the sky had begun to darken to the west. A cold wind was blowing down

the path at him, forcing him to bow his head and trudge along once again. A couple of painful minutes later, he was home.

And here was another of his problems. He had no house. . . .

The lack of adequate shelter was just one more parcel in Lin Palmer's burden of suffering since his arrival at Mu Cas-siopeiae.

He'd had a house once, a little clap-board place back home in Maine, made of real wood with a fresh coat of white paint and bright blue trim. But that was twenty-five years in the past now, and the paint had long since peeled off and the clapboards begun to warp. All those years had flashed by between the blinking of his eyes when the breakthrough colony's twenty ships were transformed into solitons and flung at light speed across the vastness of interstellar space.

Lin's disappointments had begun with the colony's bittersweet arrival in-system. Only nineteen of the ships had made it. In one instant, subjectively speaking, they had lost five thousand of their fellows.

And then there was the struggle over the landing plans. . . .

Sixty dens had set out for Asgard, risking the long flight out to Mu Cass. Three were lost, but the rest arrived intact. Each den contained 400 families, all organized around a single economic mission—1,600 souls all told, with 3 dens to a ship. Half the colony's dens were farmers, the other half provided specialty services—education, health, construction, transportation.

When they left Earth for Asgard, they expected to find scouts waiting for

them, with townships laid out in the best site for a new colony, landing assignments drawn up and ready for their approval. What they found was something else: Peter and Eric Kolberg and their associates, from the colony on Tikarhisat, six light-years away at Eta Casiopeiae with a plan of their own.

The Kolbergs had borrowed a scoutship from Tik's scout den and beat the Asgard colonists to their new home by a few weeks. They had an offer they didn't think the new colonists would refuse: let them run the colony. After all, they argued, the Kolbergs already had fourteen years' experience managing their part of Tik. Use their know-how to its best advantage, let them in as a management and consultant team.

Some of the colonists bought the idea—the ones who were too scared to think for themselves, Lin had noted scornfully. And some of them, Lin included, recognized the brazen attempt at usurping the colonists' new world for what it was.

The three dens on the "Bates" had included Lin's own, den Aroostook; a Canadian farming den, Jasper, from Alberta; and a school den, Stowe, from Ohio. Naturally, opinion split three ways—den Aroostook went against the Kolbergs, den Jasper supported them and den Stowe didn't know what to do. For a few days, while the colonists remained in orbit, sealed in the cramped ships like sardines in a can, things got pretty tense, with the members of each den bristling at the intransigence of the others—especially as it looked like the Kolbergs were going to get their way. But then den Matanuska on the "Ham-

ilton" mutined against its colonial service crew and began the landings anyway.

The rest of the colony followed quickly, leaving the Kolberg plan in pieces in the wake of their mad dash to the surface of Asgard.

For Lin Palmer, Colony Day had been an experience full of exhilaration and joy. He and his wife, Jackie, had come down in den Aroostook's first wave and spent the night in a tent in the woods near the Highland Scout Post. And the next four nights as well. Then the scouts had led them to the southwest to the den's assigned township; the Palmer's and the rest on foot, their personal effects and tents in the few trucks that had been landed.

The landings and the trek seemed like one long celebration, a party to commemorate their safe arrival on the new world. They'd spent another two weeks camped out at the village center while the den organized itself and more of its equipment and supplies landed.

There was something romantic about living out of the tent, sleeping under the stars in the warm, tropical air of Asgard's brief summer, listening to the chitinoids hum and click and the wild herds of grazing blue-necks lowing and hooting to one another.

It was the middle of July, almost six weeks after the first of the landings, when Lin and Jackie drew their basic equipment and were assigned title to their 64-hectare farmholding. The rest of the den members helped them pack the truck and two of their neighbors traveled with them most of the way along the slow, bumping, cross-country drive. They had pitched their tent once again, now alone in the great emptiness

of more than half a square kilometer of land that was all theirs.

The romance had died when the first cold winds of November blew through South Valley.

Late in September, a crew from the den had come through and cleared and fused the foundation slab for the house. And a week later, a truckload of woodsmen came through and cut down a stand of terrestrial pine at one end of the Palmer farmholding and left it to cure by the slab.

But now it was January. Winter was already six days old. It had been four months since the breakthrough colony had landed. And the Palmers still didn't have their house.

The only consolation was that more than half the 95,000 colonists on Asgard were in the same predicament. For all the planning done back on Earth before they left, they had still overestimated by far the number of houses that could be built by the colonists before winter set in.

Lin and Jackie had been low on the priority list—behind families with children and oldsters. But that was before Jackie got pregnant. . . .

"Lin, is that you?" his wife called from the rear compartment of the improvised lean-to that they'd built to expand their living space and protect against the cold.

"Were you expecting someone else?" he asked as he put his arms around her in a hug.

"Yes, but not for six more months—or is it five months now? I can figure out a 30-hour day, but the calendar is going to get the best of me."

"Just as long as the little darling doesn't get it confused."

"Were you out in the greenhouse all that time?"

"Yes," he mumbled. He turned to the kitchenette to get some hot water for tea and braced himself for what came next.

"Don't you think you're spending too much time on that, Lin? I mean, we don't even have a house yet."

He turned a deaf ear to her. Jackie was a shoemaker's daughter, not a farm girl. She didn't understand a lot of how Lin felt. He couldn't explain to her why he'd invested so much capital and labor in the project. He couldn't give her the faith that had carried him this far. He wanted to explain to her how it was going to make the whole surplus for their farm once he got it up to scale, but he was afraid it would only start an argument. And he didn't want to upset the expectant mother of his first child.

"Did you hear what I said?" she asked after a minute.

"My labor budget's been OK'd by the den council," Lin said finally. At least they trusted him—a thought that went unvoiced.

But the truth was that Lin was getting nervous about the future, too. . . .

Martin Meyers watched the snow fall between the chicken coops, blown by the wind and sticking in big clumps to the plastic ducts that connected the low sheds. The air was still and the sound of the snow splattering on the plastic could be heard over the soft clucking of the hens.

He opened the storage shed and took down the bucket and the chicken feed,

pouring a measured amount of one into the other. Then he distributed it among the coops. Next, he went gathering eggs—four dozen by the time he was done. Finally, he began cleaning the coops, working doubly hard on the surfaces to make up for the fact that he wouldn't be able to do the chore tomorrow—he was signed up for ten hours of communal labor.

While he regretted the weekly sacrifice of a day's work on his own farm, he welcomed the advantages that den Jasper's labor pool provided. Unlike many of the Asgard colonists, he had a house already. It was built in September by den work parties and finished in five days—a different party every day.

Den Jasper was a tight-knit family, bound by church and marriage long before the colonists ever left Alberta. Well organized, too. Marty's farm was already obligated to plant sixteen hectares of corn to support the den's dairy herd. The chickens were his choice for a farmyard project—picked from a list of those the den required. He had put a lot of time into building the coops, but he wished he could have put up more of them. The chicks were there for the asking, but Marty's access to the den's capital assets was limited. And the way the den council picked apart his labor budget, he didn't see how he could have found time for more.

He sighed at the thought of it, then let the thought go. There would be time. The world was still brand new, fresh and virginal in its heavy coat of ice and snow, the scout-planted pines and native greenwoods covered with white lace. All things could be worked out in time. And with the den's help, they would be.

In the meantime, he wasn't sure he would ever get used to the long Asgard day. He'd grown up on a farm and was used to rising before the sun—but here it was hours after breakfast before the deep golden rays of Mu Cassiopeiae peeked over the shoulder of Mount Loki. By the time dinner rolled around at 1700 hours, Marty felt like he'd put in a decent day's work—but he still faced another four hours of work until suppertime. And then there was paperwork and bookkeeping to tend to after dark. When he finally fell into bed around 2500, he was ready for twelve hours of sleep, but he could get only ten.

Marty grabbed a snow shovel—a piece of packing crate bonded to a staff of hardwood—and cleaned the light cover from the path to the house.

He paused at the back door to admire the handiwork of his denmates. Rough wooden shingles covered the roof, coated with sealant to keep out the elements. More shingles sheathed the exterior walls of the bungalow, with careful woodwork around the doors and windows. The back porch served as a mud room and heat-lock to keep the cold wind outdoors.

Long days and short seasons. Autumn seemed to have come and gone in a week. The warm weather had lasted so long—except for the two cold snaps in early September that brought ten centimeters of short-lived snow. And then suddenly, it was cold and the snow was piling up instead of melting away. The herds of redcrests and blunecks went away and maxidons followed them. The wilburs and orvilles flew off to the south, leaving only the high flying ed-

dies to come down from the Vogelsberg Ridge to hunt for bytes and snow lizards.

With luck, the winter would be gone as quickly as the summer. But spring was still five weeks away—and each week held seven long, long days.

Like every other colonist on Asgard, Marty wondered what kind of miserable weather those weeks would bring.

"Is that you Marty?" Lois called from the study at the rear of the house.

"Of course, sweetheart," he said as he stuck his head through the door. His wife was seated at the keyboard of the household mainframe, going over the planting scheme for the spring. He looked over the numbers quickly and shook his head—how much did she think the two of them could do?

"Hello, dear," she said. "You know you're supposed to go down to the village tomorrow, don't you?"

"Oh, don't I?" Marty said.

"Do I hear an attitude developing? You're supposed to be glad about your opportunity to work with the your den brothers."

"It's just that Hans Becker is a pain to work for and he's leading the detail tomorrow. And there's so much that I want to do around here—"

"I think Hans is very nice," Lois said. "Anyway, I want you to find out if the Kolbergs are really going to be at Sunday's services. That's what Ellie Black said, and I want to know if it's true or not. I've got a special dress that I've been working on, and I need to know if I've got to finish it by then or not."

"The Kolbergs? What do they want

with us? I thought they'd caused enough trouble before Colony Day."

"Be nice, Martin. The Kolbergs could be very helpful to us. They've got a lot to offer den Jasper and if we're smart, we'll take every advantage of it. After all, they've got fourteen years of experience from their own colony and they're a lot more useful than the scouts."

"Yes, dear," Marty said as he tuned out his wife's voice. Regardless of what she thought, he did not like the Kolbergs. The chaos of those first days in orbit before the landings began had been a terrible time. Marty blamed them for the fear, the uncertainty and the bitterness that had been the result. It was an opinion, however, that he kept to himself, since it was not shared by anyone else he knew in den Jasper—including his wife.

But in the four months since then, the bad feelings left in their wake had gradually faded. Today a new question plucked at him. What were the Kolbergs up to now?

TWO

"What are the Kolbergs up to now? That's what I want to know."

Joey Baxter heard the voice of Guy Stanger, his sister's scout boyfriend, before he reached the kitchen.

He came through the door in time to see her sit down beside Guy and press up against him.

"Why do you eat so much meat?" she asked.

"This isn't meat, it's soup."

"It's got meat in it. Fuzzasaur meat. It's not healthy to eat so much meat, you know, especially fuzzy meat. They

haven't had the cholesterol gene'd out of them like our dairy herds. And besides, you should eat more vegetables."

Joey laughed. His sister was always giving Guy a hard time about his diet. She reminded him of their mother that way, always trying to tell people what to do.

"Hi, Em. Hi, Guy," he said with a wave. "Anyone home yet?"

"No—you're in luck. Where have you been? And why weren't you home hours ago?" Emily asked angrily.

"Just out. Don't worry, I can't get into any trouble around here." He grabbed a piece of fruit from the counter and pulled up a stool.

"You've been hanging around with the guys from the service and transport dens, haven't you?" She turned to Guy and said: "Mother tells him not to, but he does it anyway. Ooooh, it's not fair. He gets away with murder and she pats him on the head. I try so hard and all she does is criticize me."

"What're you doing with the serfs and the truckers, Joey?" Guy asked.

"Exploring," Joey said. "I've been riding the trucks ever since they opened the road to Highland Post. It's loads of fun. You're a scout, you know what I mean."

"Don't let him kid you, Guy. He told me last night that he's smuggling tabacky. One of these days you're going to go too far and then you'll really have to pay for it—I hope."

Joey waved her off with the back of his hand and grinned at Guy. "So what's up with the Kolbergs?" he asked.

"That's what I'd like to know. You'd think they would have gotten the mes-

sage by now. Why don't they go back to Tikarahisat and bother their own colony?"

"Mother thinks they haven't given up on us yet," Emily said. "And it's six years back to Eta Cass. That's a long way to come just to give up after only one defeat. They must have some backup plan that they're working on—that's what Mother says."

"After the way they tried to steal Glacier Valley out from under your feet, I'd hate to see what they've got for a backup plan."

"Mother said we've got to watch them like a fox."

"A fox?"

"They're like dogs, only skinnier, bigger, and with a long red tail," said Joey. "They're clever and they like to get into mischief. They'll steal the chickens out of your yard while you're watching."

"I know that," Guy said as he flashed an evil look at Joey, "I read books, you know."

Guy helped Emily clean up the supper dishes as Joey began looking for his own meal. He hadn't gotten far when Ray Adamcek, his stepfather, entered the kitchen. He said hello, then retrieved a ripe cherimoya from the fridge and fetched a knife to cut it in quarters.

"You're home awfully late," Emily said impatiently. "Mom's over at the dean's office working on schedules. Joey just came home from who knows where."

"I've been trying to finish up those weather records from the Highland Post," Ray said as he plopped himself down at the table. "You know, Guy, you scouts keep the most incredibly detailed

records—storms, temperatures, even little notes about flowers and floods and frosts. But none of you ever tried to figure out the why and the how of Asgard's weather. Didn't you ever get curious?"

Joey found a seat at the end of the table and listened carefully to the conversation. He had discovered long ago that there was a lot to be learned by keeping his mouth shut and his ears open. Until he revealed his own precocious talents by making overly mature remarks, people tended to treat him as if he were invisible—a trait that he did all he could to cultivate. Of course, it never worked with Emily or his mother.

"Sure, I guess," Guy said. "But we never needed to worry that much about what makes the weather go. Theorizing is for people who have the time. I think we always had too much work to do collecting the data to bother sorting out why."

"But now that the colony is here, can't they just put all that stuff into an AI and program it to make the forecasts?"

Ray chuckled and pulled on his long beard. "I'm afraid there isn't any 'they,' Guy. Just me and a couple of youngsters who want to be weathermen some day. And I've been working for four months trying to figure out what makes the wind blow in this place. Unfortunately, just when I thought I understood how the autumn weather worked, it turned into winter. You just can't catch your breath around here."

"Do you think it's necessary to predict the weather?" Guy asked. "I mean, we got along fine for eighty years taking it as it comes."

"Sure, but you scouts were putting all your energies into surviving and subsisting. And I don't believe for a minute you weren't predicting the weather in your own unscientific way. The colony's got a bigger agenda than that. We're supposed to grow and prosper, make the soil bloom and all that stuff. There's a lot of hard work and planning involved in that. And success or failure depends on little differences at the margins. Every little advantage or disadvantage gets multiplied terribly when you're starting out on a new world like this, Guy. If we know what kind of weather is coming, we can save time and money for more important things. If we don't, then the waste can mean the difference between success and failure."

"I guess so," Guy said.

"And there's a political dimension to it, too," Emily added. "The dens are competing for resources and prestige. The ones that make a big surplus are going to be the ones that take the lead in everything else. The dens that are having trouble getting by aren't going to have time for much but survival. And with the Kolbergs around, that can mean trouble for us."

"You've been listening to your mother, haven't you?" Ray asked with a smile. Emily forced a smile back at him, but it wasn't a strong one. "She's right, isn't she?"

"I'm afraid so."

"All the more reason to find out what the Kolbergs are up to," Guy said. "Like I said before—I wish I knew what they were still doing here."

"I'm afraid it's easier to predict the weather than it is to predict what people

like Peter and Eric Kolberg are likely to do."

"I don't know," said Guy. Then he looked down the table and locked eyes with Joey, who felt a sudden warm flush across his face. He'd been discovered. "But I've got an idea . . ."

Joey sat on the edge of his bed pounding the keys of his laptop, going over his figures one more time, when the knock came at the door. He blanked out the screen, slid the laptop under a pillow and said, "Come in."

It was Guy. That was a relief—he'd been expecting Ray.

"What are you up to, scout?"

"Nothing," he replied, trying to hide the nervous excitement that had filled him only a moment earlier. He worked hard at keeping his expression from betraying him, but it wasn't enough. Guy wasn't buying it.

"They tell me down at the Main Post that you've been talking to scouts about buying tabacky."

"Well . . ."

Guy smiled. "Come on, Joey. I've got no reason to turn you in to your mother. Tell me what you're up to. I need to know if you can help me with something."

Joey weighed his options, then decided that the only thing that would satisfy the scout would be complete candor.

"Well, if I'm right, and nothing goes wrong with my plans, I'm going to be the richest thirteen-year-old—correction, twenty-two-year-old—on Asgard."

Despite his tender years, Joey was anything but childlike in his ambitions. He saw life in the new colony as an

unparalleled opportunity to become powerful beyond the limits of adolescent imagination. He was a careful student of history—particularly the history of old Earth's colonizing days. He was acutely aware of the number of rich and powerful men of exotic places like Hong Kong and Hawaii who had been youngsters when the colonies were new. He planned to take every advantage of that historical tendency—despite the best efforts of his mother, his stepfather, and his older sister.

While the adults were busy establishing their dens in townships up and down North Valley and South Valley, Joey also had been active, developing a lucrative enterprise all his own.

Now, with the completion of the road connecting Glacier Valley here in the east with the Main Post in the center, and Highland Post in the west, he was ready for business.

He had a product: tabacky. The dried weed was a habit straight out of the Dark Ages, revived during the decadent years just before the dawn of the New Era. The old vice had been pathological—ingesting carcinogenic materials on a daily basis for years. But the modern plant (which had proven highly useful as the base for a number of geneing projects) had been gened to remove the carcinogens, the toxic chemicals and even the active biological agent, nicotine. Instead, the plant now produced a variety of natural endorphins and flavoring agents that made the smoke more agreeable.

Centuries-old social customs discouraged tabacky-smoking in public back on Earth, but here on Asgard, new customs were bound to emerge—less

restricted by the crowded societies of the home planet.

"Did you ever smoke the stuff yourself?" Guy asked.

"I tried it once. It made me sick."

"And you really don't have any qualms about selling addictive drugs to people? I mean, your sister won't even let me eat meat."

"Tabacky's not addictive—no more than chocolate, anyway. I've read the studies. That's a lot of Dark Age propaganda. And here on Asgard, there are no mass production facilities. The average dose is smaller than in the Dark Ages, so you can't have constant consumption."

"Who are your suppliers?"

"The Jewell brothers." The two farmers from den Matanuska, which shared Glacier Valley with the university, had planted a patch up at the far end of the lake shortly after Colony Day. They'd had it gened once more to adapt it to Asgard's rapid growing season, and at the end of September they had harvested their crop. Since then it had been curing in a shed on the Jewell farm. Now the process was complete, and the tabacky had been pressed, shredded, and packed into one-kilogram packages.

"We've got about 200 kilograms, all together."

"And transportation?"

"Den Pullman." For weeks, Joey had been making friends with the drivers in the transport den. The long rides up and down the length of South Valley had been part adventure and part business. First he had to gain the confidence of the truckers so he could find out which one would be willing to help his

enterprise. Then he had to use them as contacts to meet colonists who might become customers.

And he had customers. There were settlers up and down the valley looking for the comforts and amenities of life back on Earth. Raw living on the frontier seemed just a little more palatable with a pipeful now and then. Most of the dens were producing some kind of alcoholic beverage—from sweet wines and malt liquors to distilled spirits. Tabacky was a little more ambitious in terms of startup investment, but that made it harder to supply. And for Joey's purposes, that was perfect.

"Sounds like you've thought of everything," Guy said.

"Almost."

"What's your problem?"

"Well, I'm not sure what I'm going to do with all the money. From what I can see, the cash economy here on Asgard is going to be pretty limited for the next few years. I could spend it on fried nunas or spineycones at the university canteen—but I get sick of that stuff after a while. Once some of the specialty dens get up and running, I can probably use it for clothes and stuff. But if this is as big as I think it's going to be, what am I going to do, Guy?"

"I can think of a lot of things, Joey, but most of them don't involve money. Do you really think the dens are going to let you do this?"

"I don't know. How can they stop me?"

Guy just shook his head.

"Anyway, scout, it sounds like you are in just the right place to do me a favor."

"What's the favor?"

"I want to find out what the Kolbergs are doing. I thought you could try playing spy for me."

"Me? I don't know, Guy. I haven't got anything against the Kolbergs. They look like they're doing the same thing I'd do if I were in their position."

"Whose side are you on, Joey? The Kolbergs are a bunch of thieves. They tried to steal the whole colony away from you when you first arrived. And look what they did to Jeannie Gilmartin."

"Jeannie was raped by LeClerc and he was a scout."

Guy snarled, and Joey was suddenly afraid of the young man's anger. "LeClerc was from Tik, just like the rest of them. Be honest with yourself, Joey. Would you really rather have the Kolbergs running things on Asgard?"

Joey let his imagination play with that idea for a minute and realized what it could mean to his own ambitions. There could be no native prodigies in a colony controlled by offworlders—only young Kolbergs would benefit under those conditions. He shook his head sharply.

"No way, Guy. I guess you're right. What do you want me to do?"

"Here's what I had in mind. . . ."

THREE

The truck was a marvel of engineering. The body was a seamless plastic shell that would not rust, flake, or crack for forty years. The tires were constructed of a memory plastic, a solid core surrounded by a semi-rigid frame. The power plant was a fusion pack electric motor using torque induction that could be removed to serve as a windlass

for farm work. Every part in every system was designed to last for decades.

But it did Lin Palmer absolutely no good buried up to its floorboards in mud.

And the strands of frost blossoms, robin eggs and other snow flowers that had wrapped themselves festively around the wheels did nothing to improve his mood.

He felt like crying, but was too scared to let himself go. And he didn't want to upset Jackie.

"What are we going to do, Lin?"

"We'll just have to get it out of there," he said.

"But how?"

"I don't know. I'll have to think about it for a minute and figure it out."

But Jackie was already upset. She had mud all over her hands, face and legs; she looked exhausted; and Lin was sure she was just as tired as he was of the dry, warm wind that had been blowing since early morning. The wind was the problem.

Lin had noticed it shift before sunrise. The tent poles had creaked and crackled as it backed around from the southeast to the west. Then it picked up in force and began to blow steadily as the sun came up. When he went out to tend the greenhouse he was amazed to see the snow withering before it.

Before lunch, most of the meter of snow that had covered the Palmer farmstead had been reduced to a few patches in the shade of the apple trees. The rest of it had melted away, leaving behind a thick mat of yellow-white grass and mud. Endless mud, thick and gooey, that clung to his feet and sucked at his boots.

If he had known what to expect, he would have left the truck where it was, secure on the fused foundation slab for their unbuilt house, next to the tent on the only dry spot for 800 meters. But at the time, he had been in too much of a hurry.

That was because shortly after 0900, Lin had discovered a more serious problem than a mud-stuck truck.

He was inspecting the outside walls of the greenhouse, leaving a trail of foot-shaped ponds as he plucked his way through slushy mounds of wet snow. The south side of the structure showed no damage from the quickthaw. But as he came around to the north side, what he saw almost made his heart stop.

The ground was subsiding, slipping away in crumbling, frothy bits towards a two-meter deep gully full of rushing snowmelt. It didn't look like regular erosion, but some kind of subterranean effect, where the soil seemed to be collapsing in on itself as the ice that had bound it together turned to liquid.

The near edge of the subsidence was only three meters from the greenhouse—a distance that shrank as Lin watched.

His blood roared in his ears and his heart pounded in his chest as he envisioned all his labor and capital washed away in the quickthaw. What could he do?

His thoughts were drawn to the logs stacked to dry on the foundation. If he could use them to brace the crumbling bank, shore it up against the underground drainage. . . .

Lin had rigged a tow rope around one of the logs. Jackie drove the truck while he tended the line. Together they dragged

three of the logs into place by the side of the greenhouse. They had been working on the fourth when the ground turned to mush.

Now Lin tried to weigh the limited time he had against the speed with which the ground was giving way. Would three logs be enough? What about the smaller trunks he needed to anchor the big ones?

"Help me disconnect the powerplant," he said to Jackie.

"What are you going to do, use it to pull the truck out?"

"I guess I could do that. If I anchored it to that pine tree over there." When the connections were all broken, Lin pulled the fifty-kilogram motor from the truck and lugged it through the mud to the trees. He returned to the cab and broke out the tackle and anchors and the rest of the gear he would need. Then he started looking at the truck, the trees, the greenhouse, and the fourth log. If he wanted to start moving things around, he'd need a lot of rope. There was more in the back of the truck. And before he moved it out of the mud, that last log would have to go into place.

He never actually decided to abandon the truck to the mud. He just kept giving other things higher priority.

Of course, he didn't bother explaining that to Jackie.

"Lin, what about the truck?"

"What about it?"

"Aren't you going to get it out of the mud?"

"Later. After I do this."

"But—" She stammered and sputtered. "Why do you always have to do everything your way?"

"You mean one thing at a time and

by myself?" Lin asked with practiced sarcasm. "Because it's the only way I know how."

"The way I see it, you're going to run into two problems," Cord Jackson said as he eased the truck up onto the roadway from the stop at Camp Falls.

Joey's eyes were flying everywhere, drinking in the view from the high cab of hectares of broad savannah. They rolled quickly past snow-covered plains that stretched off towards the highlands to the north and south. The dark shapes of distant houses and tents on the farmsteads gave evidence of the impact of the human settlement on a plain where a few months earlier great crowds of grazing fuzzasaurs—redcrests, blue-necks and duckasaurs—had roamed freely. Joey wondered what would happen in the spring when they returned.

"Now I ain't exactly an expert on the subject, but everyone's got a little business sense. And what you're doing here is a business, you know. In any case, the problem I see you having is that you've only got a limited amount of that stuff. Now how much of that tabacky do you expect someone to smoke in, say, a week?"

"For planning purposes, I've estimated fifty grams."

"Oh yeah?" Cord said, a puzzled expression across his face. Joey realized that he had thrown the truck driver off balance with his ready answer. "Anyway, how long do you figure your batch will last?"

"Using fifty grams per week, I calculate twenty customers a week for each kilogram and four thousand customer-weeks. That breaks out into a thousand

customers for four weeks, five hundred for eight weeks and two hundred for twenty weeks. I'm working on using the last combination."

"Oh yeah? You really got this figured out, don't you, kid?" Cord rubbed his face with one hand while he looked upwards. "Well, in any case, when your customers are done smoking up what you've got, when are you going to get more?"

"I'm not worried about that, Cord," Joey said. "That won't be until the end of September. By then, we'll grow some more."

"I guess you will at that."

Cord kept his advice to himself for the rest of the trip.

They rode west up the valley, cruising along at about forty kilometers an hour. The road was still shiny and new, fused silicon-oxides from the sandy soil, and thirty meters wide. That gave them room to pass the farm trucks that streamed along the road at less than thirty.

Camp Falls had been a ninety-minute ride from Glacier Valley, through the den Matanuska holdings in Hartsbridge township. Joey met his first customer there, Carlos Rivera, a farmer with den Imperial. Rivera was a big man, wider at the waist than the shoulders, with a handlebar moustache and rosy cheeks. He treated Joey with amused respect, exaggerated deference, and a hearty laugh.

"Care to strike a blow for freedom?" he asked as he filled a clay pipe with the yellowed weed.

Joey declined the offer, but took the payment for two kilograms of tabacky and returned to the truck.

In the next hour and a half, they

passed through Scoutpath township—named for the route they followed—and into the Main Post.

Joey was always impressed by the original scout settlement on Asgard. It had been the center of human activity on the planet for fifty-five years—that was ninety-three Asgard years, he calculated—and was full of ingenious machinery, aging equipment and scouts, and enough arcane memorabilia to keep him occupied for months. But today he was on business and had no time to dally.

He found his next set of customers at the horse barn: Jimmy Gilmartin, Andy Osborne, and Phillip Sanderson. The scouts were anxious to try the new treat from Earth and fell all over one another to open the packages Joey had delivered. They thanked him, and stuffed his pockets with the scrip used for money by the colonists, and waved him on his way.

After a few minutes, Joey and Cord were on the road again, across the valley plain to Center Township. The new hub of civil society on Asgard was only a few clicks from Main Post, on the far side of the landing field.

This was the closest thing to a city on the planet, and that was no accident. The colonists had been forced to choose, on short notice, between a plan offered by the scouts, with a few modifications of their own, and one presented by the Kolbergs. The Kolbergs had called for a powerful city with half the colony's population concentrated in one or two townships. Instead, they had chosen a decentralized plan with a smaller center and a more dispersed population.

Although he'd grown up in the

sprawling, crowded arcologies of Earth, Joey had come to regard Center as the epitome of human activity. Seven dens—more than 11,000 inhabitants—all packed into a couple of square clicks, with a main street, shops and stores, a hospital and a courthouse. Why, some of the buildings here were three stories high!

But, this was not the market he was looking for. This was the turf of one of the service dens, and those scions of Earth's urban centers cultivated a more refined set of vices and habits. He had realized early on that tabacky would be too mild a pleasure for them.

"Here's the depot, Joey," Cord said as he pulled into a large lot full of trucks, buses, and other vehicles. "I think Pat Turley's heading on up to Highland Post, if that's where you plan on going."

Joey reached under the seat, pulled out his backpack and looked in at the six remaining packages of tabacky. "Thanks a lot," he said, as he slipped from the cab. A short time later, he was on his way out of Center in the cab of Turley's truck.

The ground was more rugged in the west end of the valley, rising up from the river banks to the lower slopes of Mount Thor in steep, rocky ridges. But in between were more flatlands, still covered with white snow, but dotted with silver ponds of melting slush. The wind had become rough and dry and quite warm.

Joey was surprised by the contrast from earlier in the morning. This wasn't the kind of weather he usually encountered. Warm winds were usually moist and came out of the east.

He pondered that question as the truck

came around a low hill and crossed a piece of what looked like broken pavement. Joey was still trying to figure out what could have broken the fused surface when he began to feel light-headed. He wasn't dizzy, though, merely falling.

The truck tilted downwards as the road beneath it slipped away, collapsing out from under itself. The cab of the truck lurched and bumped and rolled, then crashed to a sudden halt. Joey's seatbelt cut into his shoulder, but held him firmly, which was just as well, because the truck ended up nose down.

"Are you all right, young fella?" Pat Turley asked before groaning softly.

"I think so," Joey replied.

"What happened to the road?"

"Maybe it was a washout. Is the truck all right?"

"No power. I don't think so. Let me get out and look—as soon as I catch my breath."

Joey started to work on his seat belt, then noticed that his hands were shaking. He paused and tremors passed through his body several times before he brought them under control.

It was another ten minutes before either of them worked their way clear of the cab. Then Pat Turley let out a low whistle.

"What is it?" Joey asked as he came around to the other side of the truck.

"The power plant's been ripped right off the axles," he said. "Must have happened on the way down that slope. See the motor back there? That means we've got no motor, no power and no phone."

"What do we do now?"

"Start walking, son."

* * *

FOUR

Joey didn't realize that he'd left his backpack behind until he had been walking for more than half an hour. The shock of it made him realize how dazed he was by the crash. Even so, he was not happy with himself.

"Sometimes, Baxter, you act like a damned adolescent," he said aloud.

"What was that?" asked Pat Turley, who had unzipped his jacket and pushed back his cap in the warm wind.

"I forgot my stuff back at the truck."

"We'll pick it up later. It's only a few more clicks to the village. Just over this rise."

Just over the rise was nothing but another empty stretch of road. Joey was disheartened, and Turley cursed. They began walking dejectedly down the slope and had gone nearly three hundred meters when a small farm truck rolled up over the crest of the hill behind them. It slowed to a stop beside them, and the two farmers inside called out.

"Are you two from that truck back up the road?"

Pat nodded.

"Are you all right?"

"We could use a ride," the truck driver said.

They piled into the back of the truck, and a few minutes later they were at the village center.

Joey could tell by looking around that this township had only one den for a proprietor. Many of the villages around the colony served as home to the service and educational dens, but there were also a substantial number of solos. This wide spot in the road to Highland Post boasted a lodge, a meeting hall, several

cow and horse barns, storage silos for the animal rations, and warehouses for the colonists' rations.

"Welcome to den Jasper," said one of the farmers as they rolled to a stop in front of the lodge. They helped them find their way inside and introduced them to the folks there. Within a few minutes, the women were shoving cakes and apple cider at Joey, and the men were talking about repairs with Pat Tuley.

They decided they would organize a repair team to see if the truck could be salvaged. But the expedition itself would have to wait until one of the work crews returned to the village to lend a hand. Over the next two hours, Joey found little to keep him occupied. He had his fill of pastries and cider, wandered around the lodge, found a library with little of interest, and peeked into offices that were dark and uninviting.

Then, in the main hallway, he came across the community bulletin board. The screen was filled with notes, messages and announcements. He reached up and touched the tags on the items that looked interesting and read through them quickly. Most of it was simple agden business, about as interesting as watching corn grow.

But this last note wasn't.

"Meet the Kolbergs—Reception after Sunday service at the Lodge. Eric and Hannah Kolberg, Miles Verstig, Peter Vandenberg, and Lilliam Roman. A chance to socialize and talk shop . . . find out what our friends from Tik can do to help den Jasper grow and prosper."

A few minutes later he was at the main office again, asking to use the sat-

ellite phone. The young farmer behind the desk grinned, then obligingly led him down the hall to the communications center. Shortly after that, Joey had Guy Stanger on the phone.

"Joey, where in the world are you?" he asked. "And why are you calling me?"

"I'm at den Jasper. Our truck broke down."

"Your truck? What truck?"

"Never mind that right now. I need you to do something for me. You have to tell my mother where I am and tell her I'll probably be spending the night here."

"I don't know, Joey. What's going on?"

"I can't talk now, Guy. But it's real important that you tell my mother and fix things with her so she isn't mad at me or anything."

"And why should I do that?"

"Because you owe me the favor. After all, I found what you said you were looking for the other night."

"You did, did you?"

"Yeah. I'll tell you all about it when we get back."

"All right, Joey. We'll see you tomorrow."

A short while later, the repair team was mustered in the yard in front of the lodge. By now, the ground around the village had turned into a sea of mud. Joey struggled to keep up with the men.

One of the farmers looked down at him with a stern, inquisitorial expression as he started to climb aboard the truck.

"I left my stuff back there. Pat said I could go back and get it."

He felt his life hang in suspense for

a moment as the farmer narrowed his eyes in disbelief. Then Pat spoke up. "Come on up here, Joey. Keep out of this wind."

In a second he was aboard the truck and they were on their way.

It only took a few minutes to reach the site of the crash. Sliding soil had drifted around the wheels of the truck, but otherwise it was still in the same embarrassingly helpless state it had been in when they left it hours ago.

While the men inspected the damage and surveyed the situation, Joey climbed up onto the truck and opened the door to the cab, hoping to retrieve his pack without notice. But when the door was open wide, he was hit in the face by a wave of fluttering chitinoids, dozens of them, all glittering with bright spots of color on their black enamel shells. They filled the cab of the truck and spilled out in a cloud.

Where had they come from? And why were they in here?

When Joey reached under the seat and pulled out his pack, he knew why. Inside, where six kilos of tabacky had been, there was a mass of silvery chite eggs. A chite bloom! The quickthaw had brought out a colony of chites, which had stumbled across the pack in its search for an organic base to plant its eggs.

His heart sank as he realized what this meant to his dreams of enterprise.

It had been a long, hard day for Marty Meyers. In the morning, he and his denmates had worked in knee-deep freezing water to shore up a wooden bridge across a brook that had swollen to river proportions. After low noon, they had

gone on to rescue a barn whose foundation was undermined by the quickthaw. And after late noon, it was towing duty for a dozen trucks that had gotten stuck in the mud.

The sun was already ducking behind Mount Thor and the warm, dry wind was beginning to take on a chilly bite when their truck rolled back into Jasper village. The men stumbled stiff-legged and sore into the community hall and made a direct attack on the coffee stand. Marty joined them, even though the substitute the hall used for real coffee was almost undrinkable.

They had only been there for a few minutes when Hans Becker showed up. Marty had been relieved that morning when he reached the village and discovered that Becker wouldn't be leading the work detail. Now that Hans was back, he felt a knot growing in his stomach. Whatever he was up to, it had to be bad news, judging by the smile on the man's face.

Becker took a seat beside the coffee pot and put his laptop down on the table. One by one, he called the men over to him.

After a couple of minutes, it was Marty's turn.

"I've got some difficult news for you, Martin," he said. "I'm afraid we're going to have to increase your communal labor requirements by at least five hours a week."

"What?" Marty snapped back in surprise. "What for?"

"We've been talking it over at the council, and considering the problems we had to handle today—and the likelihood that they'll be hitting us again—we've had to readjust our work

schedules. This isn't the first time we've had to do this, and every time we fall further and further behind on the goals we want to meet before spring. I'm sure you realize how important it is to have everything in place when the cold is gone—especially when you look at how little time we'll have to get things done. Six-month years are a little hectic when it comes to planning."

"You've got to be kidding," said a man behind him. It was Tom Hoffman, one of the more outspoken members of den Jasper.

"I know—you've already got more than enough to do," Hans said. "But the den has its own demands, and we're all going to have to make sacrifices if they're going to be met."

Martin felt the anger grow inside him. This wasn't the way to handle something like this. There should be a council meeting—and a vote. Hans had no business making an announcement like this without being on solid ground.

"Did the Kolbergs have anything to do with this?" asked Hoffman.

"I don't know what you mean."

"Sure you do. This is part of their management plan, isn't it?"

"The Kolbergs?" Marty asked, looking back at Hoffman.

"The den council's been talking to them about their management and consultant services," he said. "The word around the village is that upping the communal labor budget is the quickest way to improve our productivity. That may not be a problem for people like Hans here, but for the rest of us it's a real problem. It may be quiet now, but in a few weeks I'm going to be busier than a two-credit hooker."

"Sorry, Tom, that's the decision."

"Well I think the decision stinks. Who's running this den—us or the Kolbergs? What do you think, Meyers?"

Marty, who had stayed back during the argument, looked up sheepishly. "I don't think you're going about this the right way, Hans. Shouldn't something like this be put before a den vote? It's one thing if we all agree to it, but I don't want the Kolbergs to up my labor budget anymore than Tommy does."

"Look, you two," Hans said, "the Kolbergs know more about making a colony successful than either one of you do. If we follow their advice, we can be one of the leading dens on Asgard. If we don't, we could end up like den Aroostook or even worse."

Hoffman just sneered. "That's easy talk from a man who doesn't have a farm of his own to take care of."

That seemed to get Becker's temper up. Marty watched as he started to turn red in the cheeks. "What's that supposed to mean?"

"It means that anyone can call on more communal labor if they plan on keeping their land fallow for a couple of seasons like you."

Becker rose from his chair and reached across the table to grab Hoffman by the jacket. "Why you—"

Hoffman tried to pull back, but he just dragged Becker further over the table. Marty reached out without thinking, trying to break the two of them up. He caught a hold of Becker's wrists and tried to break his hold.

But he wouldn't release Hoffman, and Marty's interference only served to throw him off balance. The only thing that kept the three of them from coming

to blows was the sudden collapse of the table.

The men leapt back as the urn of steaming hot coffee fell to the floor and black liquid splashed at their feet. Hans Becker flew backwards, cursing loudly at both Hoffman and Marty Meyers.

Marty backed up, heading for the door. He just wanted to get into his truck and start the long, bumpy drive home. But before he left, he caught sight of Becker, being calmed by a couple of his friends.

"I won't forget this, Meyers," he called as Marty stepped out into the cold.

FIVE

Ray Adamcek felt a tingle of excitement race up his spine as the ground fell away from him and streamed swiftly towards the rear of the scoutship. He gripped the arms of his seat as the ship buffeted its way through the turbulence layer, then beamed wide-eyed out the windows as the stars began to emerge.

But he cut his star-gazing abruptly short as he realized he was missing an opportunity to observe something even more tantalizing—the weather over the Prime Site, Mount Thor and Mount Loki, and the colonists in North and South Valleys.

He rode on the port side of the ship as they flew into the sunrise, giving him a wide view of the land to the north. As they climbed higher and higher, that view grew to encompass the great continental glaciers that gripped the northern quarter of the planet—or at least the perpetual clouds that clung to their hems. Foul weather was a certain constant under those clouds—rain that fell

in unending torrents and winds that blew unceasingly.

Off to the west were the Ragnarok Mountains, of which Thor, Loki, and Odin to the north were but the lowest teeth on a jaw that descended into the sea. Glaciers clung to its peaks and valleys in a brachiating pattern that reminded Ray of frost on a pane of glass.

The upper-level low that had brought the snow, and then the Chinook winds, to the valleys had turned into a full-fledged storm running north up the coast into Bifrost Bay, dumping great loads of snow as it pulled moisture in from the sea and up the steep coastal mountains.

"Bad luck, those Chinooks," he said as he noticed the pilot relaxing his grip on the controls and turning the ship over to the computers. The pilot was a scout, an old-timer with cracked brown skin, a fringe of short white hair high over his ears, and a permanent smile. His name was Abe Johanson.

More information than that, he would not divulge. Ray wondered if putting up with eight decades of Asgard winters had made him so taciturn.

Nimbus, the little AI in the shock-proof plastic case, provided more conversation than Johanson.

"Chinook—also known in Europe as foehn winds—air descends down a slope warms adiabatically and becomes dry."

"That's right, Nimbus," Ray said. "A common occurrence in the American Rockies and the European Alps—and on Asgard. Only this one took us by surprise. Half the colonists got hit by it somehow. Even some of the scouts were surprised."

"Surprised by the size of the melt,"

Abe said. "Don't usually have that much snow on the ground."

"That's right. The average for this time of year is more like—"

"Twenty centimeters," Nimbus said.

"Sounds right," Abe said, nodding his head.

"Now if they had known it was coming, I'll bet it would have saved a lot of people a lot of work."

The scout looked up at Ray with a questioning look in his eyes. "If I'd known it was coming, I probably would have told someone," he said after a moment's pause, before turning back to his computers.

Ray ignored him and looked back out the windows to the north. This was what he had come for. He had studied the statistics, the charts, and the notes the scouts had accumulated over the past ninety-three winters. He had run a few models through Nimbus. But he still didn't have a feel for the twisting patterns of shifting wind and air masses that determined Asgard's weather.

No, for that kind of understanding he needed something else. Something more direct and immediate. He had to watch the weather as it unfolded its drama on a continent-sized stage.

And for the next few days, he would have a reserved seat, front row center, for the performance.

Sunday was not a good day for Lin Palmer.

By nightfall Saturday, he had succeeded in shoring up the muddy slopes that had threatened his greenhouse. It had taken a quarter of the logs set aside for his house, but in the end, he had a retaining wall, staked in place and

braced with cross-beams, covering the lower side of the ditch. In addition, the rushing stream of melting water subsided, and the erosion slowed as the afternoon heat faded and the wind died down.

That should have told him something right there, but he was too exhausted by that point to think straight.

The next morning, Lin and Jackie found themselves surrounded by a world of frost. During the night, a mass of bitter cold air had slipped down off the northern glaciers. The lingering moisture on the ground, drawn up to the surface by the chinook wind and then the dry northern air, had turned to a fine dusting of shimmering, glittering diamonds that coated the world.

The fusion plant in the front half of the tent was working overtime to keep the place warm—a hard job, with all the lean-to's leaks and gaps. Lin barely had his boots on when the awful realization hit him. His truck!

He pulled on his parka as he rushed out the door, leaving Jackie protesting behind him. He ran across the yard, his feet clinking heavily in the hard-frozen soil, to where the mud-stuck truck still sat, buried up to the hub caps.

The snowflowers had died, leaving behind brittle grey tendrils where they had grown. The ground had refrozen, deeply, during the sixteen-hour night. And the truck, which had only been stuck the day before, was now encased in an unbroken expanse of ice and mud.

Getting it out would take a power hammer and a backhoe.

He felt his throat constrict and his eyes water as he realized that the heavy freeze had also eliminated the threat to

his greenhouse by stabilizing the soil and ending the quickthaw, making all the previous day's work unnecessary. He could have spent the afternoon getting his truck out of the mud instead.

If only he had known—if only someone had warned him about what the weather would bring next.

"It's called a chinook wind and they explained it on the school net last night," Jackie said when he came back inside.

"What?" he asked, holding his anger and frustration inside.

"The warm wind yesterday. They explained it on the network last night. The wind blows down off the mountains and gets dry and warm. It happens a lot in the winter, the scouts say. Too bad no one warned us."

"Yeah, too bad."

"Too bad you didn't get your truck out of the mud."

"Yeah."

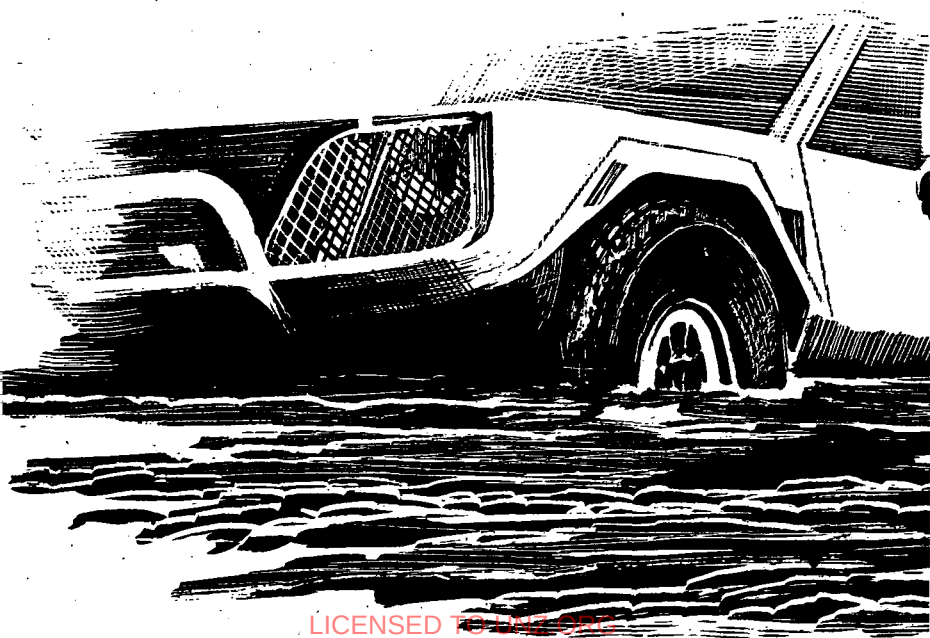
"Now what are you going to do?"

"I don't know. When's the next wind coming through?"

"That's a good question. . . ."

Marty Meyers was almost late getting to church. He'd spent too much time puttering around the chicken coops trying to make sure they'd stay warm. The cold air that blew in overnight worried him, but the fusion plant was doing a fine job and his efforts weren't really needed.

Lois complained all the way to the village. He half-listened, knowing that she would not stop until they arrived safe and on time. And when they did she was hardly satisfied, but held her



tongue at last.

The entire den had assembled and the yard was full of trucks. Marty dropped his wife off in front of the meeting hall and found a place to park. The service was just beginning by the time he found his way back to the hall. Lois had found a seat in the last row, and he joined her just as the first hymn began.

When the singing was over and the prayers finished, Pastor Gant rose and greeted the congregation. From where he sat, behind most of the 1,600 members of den Jasper, Marty could not see the minister, but Gant's amplified voice echoed off the ceiling overhead.

He began by mentioning the number of sick children and oldsters who couldn't make it to the service. "We have sixty cases of Mud Pox, but the folks at den Schweitzer have given us a counter-virus to take care of it. And there are

another forty with the Wheezer bug—including Alice Clarkson, who, as you all know, is the oldest member of the den, although she has asked me not to reveal by how much. The doctors say that she's doing well and the antibiotics are working just fine. I'm sure all our prayers go out to Alice and all the rest of our brothers, sisters, and young ones."

Marty shifted uneasily in his seat. He never did enjoy services. Lois was the one who had brought him into the church in the first place and had pushed him to sign up for the breakthrough colony ten years earlier. She loved the social environment, the chance to trade gossip and inspect new dresses and shoes—though there wouldn't be any new shoes on Asgard until the apparel den was all set up for production.

"Now I'm afraid I have to turn to a



less charitable subject," Pastor Gant said. "As many of you are aware, the den has been working recently with our neighbors from the colony at Eta Casiopeiae. The Kolbergs and their associates have been very kind to us and have offered us all kinds of help in getting den Jasper set up and functioning. I'm not sure how many people realize it, but they have strong ties to our synod on Tikarahisat and they've said they want to help us keep in touch with them, to the extent possible given the time it takes to travel there. After today's services, there'll be a reception for Eric and Hannah Kolberg and some of their friends.

"But I'm afraid there is a sour note being struck here. The den leaders have called my attention to the fact that some of the den members have been stubborn and uncharitable towards our newfound friends. There's been some complaining and even a few incidents that we won't bring up at a worship service.

"The point I want to make, however, has to do with this church as a community. It's very important that we join together on issues as important as this. One of our strengths as a den is our sense of oneness and our commitment to one another—both as church members and as den members. The two go hand in hand and cannot be separated.

"Now there are some among us who think they know better than the den council and den leaders about what we should do. Their prideful attitude hurts us all and threatens to divide us as a group. As your pastor, it is up to me to curb this kind of behavior and this kind of attitude.

"To do that, I'm afraid I will have

to take steps that I find painful and regrettable, but necessary. Those of you who feel that they cannot support the den in its decision to rely on the Kolbergs for guidance and aid have put themselves beyond the brotherhood of this den, and beyond the brotherhood of this church. If you persist in your attitudes, I'm afraid I will have no choice but to exclude you from communion—beginning next week."

Marty hadn't been listening too closely—talk of the Kolbergs bored him more than anything else. But the congregation fell into stunned silence at that last remark, and Marty shook his head, uncertain that he'd heard Pastor Gant correctly.

The pastor quickly went on to the next hymn, which Marty suspected was a ploy to get everyone busy singing instead of brooding about his threat. But with Marty, it wasn't successful. Without communion, you weren't part of the church, he realized. And if you weren't part of the church, how could you be part of the den?

The rest of the service went slowly, punctuated by nervous rustlings among the members. Communion took a long time, with hesitant communicants shuffling up the aisles and eyeing one another suspiciously. Because of their location in the hall, Marty and Lois had to wait until the last wave.

With a sigh of relief, Marty rose from his knees and returned to his seat, glad that the service would soon be over. It was, but the ordeal was not.

The reception for the Kolbergs was a more festive affair than the long worship service. The food was unspectacular for the most part, with cakes and

pastries made up from the bland rations available to the colonists. Next year, when the planting began and the harvests came in, it would be another story, but for now they were still dependent on the food they'd brought with them.

Lois made her way through the crowded hall, Marty in tow, as she looked for her friends and co-conspirators in the Sunday gossip exchange. Marty remained oblivious to them, nodding politely and keeping an eye out for the men, who could swap some useful information about den business when their wives were otherwise occupied.

He didn't see Pastor Gant until the last minute. Gant was an older man, gray at the temples with a face full of creases. He shook Marty's hand and grabbed his arm above the elbow—then refused to let go. He put an arm around Lois and pried her away from her friends.

The pastor did not have a smile on his face.

"Martin, Lois, it's good to see you here today," he said. "It's always nice to have everyone at the service."

They nodded and smiled nervously.

"Martin, I hope my message this morning wasn't lost on you. Especially after what happened yesterday, if you get my meaning."

Lois looked sideways at her husband, who felt his face grow warm. "What happened yesterday?" she asked.

He started to explain about the incident between Hans Becker and Tom Hoffman, but the pastor beat him to it. Unfortunately, he had only heard Becker's version of the story.

"Let's just say that Martin and brother Hoffman were more spirited than pru-

dent in their actions," the pastor said. "A word to the wise should be sufficient."

"But I didn't do anything," Marty protested as Gant walked away.

"Marty, how could you?" Lois cried. "What are you trying to do to me? You heard what the pastor said this morning. If you don't like the Kolbergs, you'd better keep it to yourself. And if you don't do something to set things right, you're going to be in big trouble with me."

She spun on her heel and walked off, pushing past a few surprised denmates and leaving Marty sputtering at empty air.

SIX

Ray Adamcek floated weightlessly in the middle of the cabin, watching the roiling clouds of Asgard's turbulent atmosphere swirl and spin in the distance.

"This is the only way to study the weather—all at once and with the naked eye," he said.

"Naked eye?" asked Nimbus from the corner where it was tethered. The AI had no eyes, and Ray wasn't sure if it could process information visually. The neural networks in its holographic brain were a world unto themselves.

"It's just an expression," Ray said. "Things aren't the same as the last time we were up here, are they?"

Back in September, they had been up in orbit to watch a pair of tropical cyclones that threatened Prime Site. The storms had boiled up without warning, cooking quickly in the long afternoon sun. They had spun off, one behind the other, careening towards the two valleys where the fresh colony was still settling

in. But much to his surprise, they had smashed themselves against the coastal mountains and had been quenched by a sudden supply of glacial air from the north.

The scene today had changed significantly in the course of a couple of months. Now the jet stream and the region of prevailing westerlies had dropped southwards, pushing before it the tropical pattern that dominated Prime Site in the summer.

"The weather patterns are not similar," Nimbus agreed. The scout pilot had retreated to his cabin for the better part of the flight, leaving Ray with only the AI for company. It did not improve his disposition.

"Forecasting this stuff is a bitch. The systems move through so damn fast, you hardly have time to give a decent warning."

"At twenty-five degrees latitude, Pettersen's formula indicates long wave velocities of twelve degrees of longitude per day, and short wave velocities of twenty-eight degrees per day," Nimbus said. "That equals thirty kilometers per hour and seventy-five kilometers per hour respectively."

"I'll take your word for it," Ray said. He knew the numbers were right, though, and that was the problem. The long waves, the progression of high pressure ridges and low pressure troughs, dominated the air circulation of the hemisphere. The short waves, the cyclones and anticyclones, rode upon the long waves.

"Great fleas have little fleas upon their backs to bite 'em. And little fleas have lesser fleas, and so ad infinitum."

"Big whirls have little whirls that

feed on their velocity. And little whirls have lesser whirls, and so on to viscosity," Nimbus replied. "L.F. Richardson, 1881-1953 A.D."

"Oh yeah?"

"The first meteorologist to attempt to predict weather using the laws of physics."

"I knew that."

Ray turned his attention back to the pattern of clouds before him. The scoutship hung in a medium-high orbit—not far enough out to be synchronized with the planet's rotation, but at a sufficient distance to give the weatherman a good look at Prime Site and the region to the west where most of its weather originated.

Since the first day he arrived, when a sudden outbreak of glacial air dropped the temperature from twenty degrees to minus ten in an hour, Ray's amazement had not ceased at the surprises this world held. The sight of a funnel cloud turned bright white as it filled with snow was one that he would always remember with awe and wonder. And the way the high speed jet stream clipped the tops off thunderheads gave them an appearance that was unique to Asgard.

But the more he watched the weather, the more he appreciated the delicate balance between heat and cold that drove the circulation of the planetary atmosphere. If he could just figure out how that balance worked.

Winter found the jet stream coursing by just south of the glaciated regions of the Ragnarok Mountains and just north of Prime Site. The topography and the permanent high pressure system of the mountain ice cap tended to keep the stream confined to these limits.

To the west, however, were several cyclone-producing regions. Two of these had a critical impact on Prime Site. The nearest was the Avalon Sea, which drained the melting verge of the glaciers and channeled it northward and westward to the sea. And beyond that was the low land in the lee of the Albion Mountains.

The storms boiled up out of the sea or the lee of the mountains and were carried east at a fast clip, where they fell upon the unsuspecting colonists without warning, sometimes dumping a meter of snow on them before blowing out to sea. They were followed alternately by the chinook winds that melted the snow in unexpected quickthaws and outbreaks of cold air that froze the world solid.

The series consisted of two or three cyclones, which hit or missed the colony on their eastward trek, depending upon their will, followed by a final storm that pulled down cold air from the north, freezing the mud, snowmelt, and everything else.

The complex balance of energies between the Avalon Sea and the Albion Mountains determined the number, course, and severity of the cyclones.

"I think I'm beginning to see the way these things fit together," Ray said. "But I'm still not there yet. Maybe if we program you to model the patterns we can figure out what makes this system work. . . ."

"Perhaps," said Nimbus. "But we have tried that before. All I've been able to do is produce a copy of the pattern—not a predictive formula."

"Let's try it anyway," Ray said.

"Your wish is my command," the AI replied.

Den Middlesex being a secular group, Joey Baxter had never spent much time in church. His mother's wedding was the only exception that came to mind, and that was brief and bearable. The den Jasper service, on the other hand, had struck him as long and strenuous, with a lot of standing up and sitting down and praying and singing.

He was glad it was over, especially when the women brought out trays of pastries and the men carried in big urns of coffee and jugs of cider. He contented himself with stuffing his face for the first hour, trying to blend in with the other children who streamed through the big meeting hall. He mingled with the adults as much as he could, doing his best to look innocent and uninterested.

But in actuality, he was listening hard to all that was being said. Eventually he tracked down the guests of honor at the reception—Eric Kolberg, his wife, and their partners—and stationed himself nearby, his back to them to act as protective coloration.

At first, he overheard little that was useful, but his ears perked up when they mentioned a smaller meeting to be held later. He noticed that few invitations were being issued to that get together. And he also noted the time and location—after supper, in the library at the lodge.

Joey was careful to get there well in advance of the invited guests. He inspected the place carefully, looking for a suitable hiding place from which he could eavesdrop on the conference. The

pickings were slim. The library was a large room with four walls lined with empty shelves made of rough wood. A cabinet in the corner contained a few dozen electronic readers and a hard disk at one end held the den's supply of books, journals, and manuals. In another corner sat a desk with a terminal and keyboard.

The cabinet was impractical for hiding unless the shelves were removed, and the desk offered only the knee-hole, which faced the open room.

Then Joey looked up. There was no ceiling, only a high loft with cross-beams and the underside of the steeply pitched roof. The space was dark and inviting—if he could find a way up there.

He tried standing on a chair, but the rafters were out of reach. If he put the chair on the table, though . . .

A moment later, hanging from the beam by his hands, he hooked the chair with one foot and swung it back over the floor. He lowered it as far as it would go, then let it drop. He held his breath as it teetered for a moment, then righted itself on all four legs. He found a dark corner towards the center of the lodge to sit in, satisfied that he would be invisible to anyone seated at the table.

An hour passed before the Kolbergs and the farmers of den Jasper began straggling in.

When the Asgard breakthrough colony first arrived at Mu Cassiopeiae back in May, they were surprised to find waiting for them an expedition from the colony at Eta Cassiopeiae, six light-years away. They were even more surprised when their fellow colonists asked them to delay their planned landings

until they could work out an alternative plan for assigning the fifty-seven colonial dens that survived the trip to individual townships in North and South Valley. Joey's mother had opposed that effort and was successful, leading the colonists down to the surface of Asgard on schedule—or as close to it as the weather had allowed.

But Joey had never shared her antagonism against the Kolbergs. The way he saw it, they were just trying to do the same thing he was, only on a larger scale. Even now, his main interest was their potential as an obstacle to his own ambitions, as young and unformed as those might be.

He had never imagined just how big an obstacle until he heard them talk.

"Back on Tik, we were six years in getting organized—Earth years, just to keep you from getting confused," Eric Kolberg said. He was a tall man, with blond hair, but a dark complexion and dark, thick eyebrows that gave him a brooding, sinister look. "The other colonists were too involved with their own problems to recognize what we had to offer. The laws and rules that they had drawn up were based on a silly idealism, a romantic attachment to a past that never was. They were not geared for the future here among the stars that is available to those who are wise and bold enough to seize it.

"I hope you are not going to make the same mistake."

The plan that Eric Kolberg described was certainly bold. The pooling of resources and capital in a strong development bank, central planning and distribution of investments, rapid build-up of industrial facilities like mining and

manufacturing, and overall management of the colonial dens by the Kolbergs and their allies. Joey began to picture the robust urbanized economy that would result from all of this and grinned at the audacity of the Kolbergs.

The development plan that the colonists had brought with them called for a slowly expanding society where half the dens would work the soil to provide food while the other half provided the special skills and services that an advanced technological society required. But his plan called for the farmers to leave the land and come to the cities that the Kolbergs hoped to build here on Asgard. The opportunities were endless, Joey realized. But only for the Kolbergs and their friends.

And the farmers from den Jasper were eating it up.

That was what scared him the most. It hadn't occurred to him that the colonists of Asgard would harbor the kinds of attitudes that den Jasper had cultivated. They were proud and arrogant, certain of their special place in the universe, sure that they would do better than their neighbors because they were favored by God.

At first, Joey thought it was a lot of superstitious prattle. But they really believed this stuff.

"The Lord must surely be smiling on us," said the man beside Eric Kolberg with a silly grin and wide-eyed stare. "He has brought us to this new world, given us this rich land and provided us with allies who will help make us strong and wealthy. I think we owe Him a prayer of thanks."

With that, the rest of the farmers

bowed their heads as he led them in prayer.

Joey just shook his head in disbelief. Wait until Guy heard about this.

SEVEN

A day of cold air, brisk wind, and deep blue skies passed before the weather warmed up enough for Lin Palmer to free his truck. Late in the afternoon, when the sun had had time to turn the soil back to mud and the wind had shifted around to the south, he hooked up the powerplant to a sturdy pine tree and connected the cable to the towing brace.

Jackie sat behind the wheel while he took up the slack, put on a strain and, finally, eased the vehicle out of the mire. Lin reeled in the line as his wife guided the truck up to the grove of trees, where the roots held the soil together more tightly and the mud was not so greedy.

"I wish I'd known it was going to warm up sooner," he said. "Don't they have a weather forecast service on the network? Or is it all just gossip and recipes?"

"If you'd plug in once in a while you'd find out," Jackie said. "The university ag-service has a program that can help you with your planting schedules. And the school dens can tell you things you never knew about this place—like how to get sweet juice from the conifers and where to look for chites when they get into your crops. In a couple of months, you'll be wishing you spent more time on the net."

"But still no weather, huh?"

"No—not yet. But if that's what it'll take for you to pay attention to what the

rest of the colony is doing, maybe we can get them to add that, too."

"The rest of the colony isn't stuck in the mud with a pregnant wife and no house," Lin said.

Jackie just reared back and regarded him with a look of stunned disbelief. "You'd be surprised how many of the colonists are in exactly that situation, Lin. Only half of us have houses and at last count, a third of the women on this planet were pregnant. And now your truck is out of the mud. So how come you're feeling sorry for yourself?"

Lin tried to think of a snappy response, but decided against it. There was no way he could win. He had a better idea.

"I'm going for a walk," he said.

He kept to the high ground, away from the mud, even though the sun was dropping toward the slopes of Mount Thor and the air was losing its pleasant warmth. Ben Cormier's farmstead was to the west and Ed Laureno's was to the north, but he didn't feel like talking to Ben or Ed. Ben was an older farmer with a pack of adolescent children, and Ed's wife didn't like Lin much, so he kept a neighborly distance. Instead, he traveled east, towards the border between den Aroostook's township and den Jasper, the adjacent settlement. Darkness wouldn't come for another couple of hours, even with the winter sun hugging the southern horizon.

Lin kept up a quick pace. It wasn't long before he came upon the narrow stream that marked the township line. The gravel along the banks marked where the quickthaw had produced a strong flood. Now the water had receded

to a manageable size, and a few meters upstream he found a natural rock dam that also served as a crossing point.

He hoped his neighbor from Alberta wouldn't mind an uninvited guest, but maybe it was time he paid a call on the fellow—whoever he might be.

The first thing Lin noticed was the line of small sheds behind the wooden frame house. The next thing was the sound of chickens clucking and crowing inside the sheds.

He hesitated, nervous about meeting strangers, then walked up to the back door and knocked. For a brief moment, he wondered how he would feel if the quiet peace of his home was suddenly disturbed by an unexpected knock—especially on an alien world twenty-five light-years from all he had once called home. Then the door opened swiftly and a young man about his own age thrust his head out into the balmy air. An hour later, all of Lin's uneasiness had fled and been replaced by a sense of warm camaraderie. While he loved his wife very much, he still had a need for alternative companionship that he realized was sorely missed.

The farmer's name was Martin Meyers, and his wife, Lois, fed him cider and apple pie while the three of them discussed farm life and their new world. After a while, Marty took him on a tour of the chicken coops. They stopped in the storage shed for privacy, Martin offering Lin a seat on a box of chicken feed.

Much to Lin's surprise, the two had a lot in common—and a lot that set them apart.

"Sometimes my wife can make me

feel like a dog with pie on his face," Lin said forlornly.

"I know what you mean," Marty replied. "It doesn't do any good trying to explain things. Women just give you that look—you know the one I mean—like nothing you say has anything to do with what they want. It's like they've got a whole set of rules that we're never going to learn."

They talked about den business and their farming problems. Lin never knew there was so much to raising chickens. And Marty was sympathetic towards Lin's problems with his truck and his greenhouse.

"If we knew what was coming at us, we might have a chance," Lin said. "Doesn't anyone know what the weather on this place is going to do?"

"Beats me. But it sounds like you've got more problems than that. Why doesn't your den do more to help you out? Everybody in Jasper's got a house by now. I can't understand why they let you live in a tent."

"We just let people take care of themselves, I guess," Lin said. "It seems like the natural way to do it. Never was any different back home. You know what they say—you can tell someone from Maine, but you can't tell him much."

Marty just shook his head. "It still doesn't sound very helpful. What happens if you get into trouble?"

"I suppose the whole den'll be out to my place if I really need them. That's just the way they are. The rest of the time, they'll leave me alone."

"Sometimes I wish our den was more like that," Marty said. He told Lin about the problems with Hans Becker,

the pastor, and the Kolbergs. "That's why I have to give another day every week to community labor. It doesn't hardly seem fair."

"Ayuh, it sure don't. Never did like them Kolbergs, though. Doesn't sound right for them to come here. Makes you wonder what they did back at their own colony and why they had to leave."

"From what I've heard, they left on their own. They were doing all right back on Tik, I guess, and wanted to try it out over here—before the colony had time to settle in and make the same mistakes theirs did."

"I don't know," Lin said. "I think every man's got the right to make his own mistakes. It's the only way he can learn anything. What kind of world are you going to have if you can't do that?"

"One where a man can't learn," said the farmer from Alberta.

"And one where a man's got no rights," said the farmer from Maine.

The next day, Marty Meyers drove through thick snow squalls to bring his eggs into the village, pressing through rising mounds of wet slush and across the combination of gravel fill and drain-pipes that forded the stream beds between his farm and the center of the township. When he had finished unloading the plastic crates and registering his production with the warehouse clerk, he headed over to the ration center to pick up the week's supplies. Hans Becker caught him on his way into the building.

"Martin, we'd like to talk to you for a minute over at the lodge."

Big white snowflakes swirled through the air as Marty swallowed hard and fell

into step behind the assistant den leader. What did they want now?

The two men stamped the snow and ice from their boots in the entrance to the lodge, then Becker led Marty down the hall to a small office, which already held another man—Marty recognized him as Miles Verstig, the Kolberg associate who had attended Sunday's reception.

"What's this all about?" Marty asked.

"Have a seat," Becker said as he went around behind the table with Verstig. Marty sat down in the empty chair facing them.

"We heard you had a visit the other night from a farmer from den Aroos-took. Is that right?" Becker asked.

Marty shrugged. "Sure, what of it?"

"Why was he there?"

"I guess he was lonely. He said he had a fight with his wife."

Becker smirked and turned to Verstig.

"How long did he stay?" Becker asked.

"About two hours. Just until dark. Then he walked home. I think he has the farmstead on the township line. Listen, Hans, what's this all about? And what's he doing here?"

"We'll ask the questions for now, Martin."

They went on for forty minutes, until Marty had lost his patience and his good-natured desire to cooperate. They wanted to know what the two had talked about, how much Marty had told the other farmer about the den's operations, its plans and programs, and anything else they could think of. Most of the questions struck him as petty and motivated by a hostile suspicion that reduced any natural human impulse on the

part of Lin Palmer to some clever, subversive plot. He didn't like it.

All through the questioning, Miles Verstig remained silent. Then, when Becker was finished, he spoke up.

"What did this Palmer fellow tell you?"

Marty was tired of being intimidated, but he thought he had restrained himself admirably. He didn't want to give Pastor Gant further reason to question his commitment to the den, or Lois further cause to hold him responsible for their social ostracism. He had tried to choose his words carefully while remaining honest.

"He told me about the troubles he's been having with his wife, the weather, and his farm. The kind of thing that any farmer would talk about with his neighbor. Or don't they do that kind of thing where you come from?"

He regretted letting the sarcasm slip out almost immediately. Apparently he wasn't being as careful as he thought he was. But Verstig ignored it.

"What kind of problems with his farm?"

Marty told him about the truck, the greenhouse and the quickthaw, and Palmer's worry about his capital and labor budgets. That seemed to satisfy both Verstig and Becker because they fell silent after he finished.

"Thank you very much, Mr. Meyers," Verstig said. "You've been a great help."

Becker wasn't nearly so polite. "We'll see you tomorrow for community labor, Martin."

On his way back to the ration center, Marty thought over the interrogation he'd been subjected to and wondered at the reason behind it. Why were the den

leaders and the Kolbergs so nervous about what other dens knew?

Then another question arose in his mind. How did they know about Lin Palmer's visit?

A sick feeling overcame him as the answer came quickly but unhappily —Lois must have told them.

EIGHT

For three days, winter storms buffeted the farmsteads, townships, villages, settlements, and scout posts of North Valley and South Valley. The first one dumped fifteen centimeters of snow on the ground. The next day another ten centimeters fell. And less than fifteen hours later, the third came through, mixing snow and violent winds.

White tornados ripped through South Valley, tearing up the landscape and narrowly missing the village of den Regan, which contained den Stowe, a school den, in addition to the leadership and support workers for the farmers. The only casualties were a family of five whose house was smashed into splinters by the storm.

And of course, the storms struck virtually without warning.

For Lin Palmer, the bad weather was an even worse break. Just before the first storm hit, the Aroostook den council sent word that the house-building crew would be out to his farmstead first thing in the afternoon. When the snow began to pile up before low noon, his spirits had sunk and with them his hopes for improvement in his miserable lot. That night, the snow piled so high on the tent that the poles began to sag and he had to go outside and brush it off every half hour. The winds picked up

and the snow began to drift across the lean-to. Faint drafts carried icy crystals into the shelter and the fusion pack was unable to keep up with the heat drain caused by wind, ice, and mounting snowpack.

The greenhouse suffered, too.

Like the tent and lean-to, it was impossible to keep it warm enough to melt the snow as it fell. The structure wasn't even as strong as the tent, and Lin spent much of his time rushing from one end to the other trying to keep the snow from crushing the fragile framework.

The second storm hit just as he finished recovering his strength from the first. Another day of frantic effort left him exhausted, unable to contemplate his next move or anything else, for that matter. When the third storm struck in the middle of the night, there was almost nothing he could do.

He tried to keep the greenhouse secure, and sometime after midnight he found that the snow had drifted around the high side of the structure and shielded it from the wind. The blowing snow couldn't pile up on the rest of the frame, saving it from collapse. He blessed his luck and returned to the shelter, where Jackie was struggling to keep the place warm.

The two of them held each other under extra blankets, and Lin slept fitfully, dreaming of his new house, which was now as unreachable as his old home in Houlton.

The dawn came in with a bitter, raw blast of glacial air, straight off the ice-pack, dropping temperatures to twenty below. Only the snow piled around the lean-to kept them from freezing inside.

But nothing that happened that day

kept away the chill that wrapped Lin's heart.

Before lunch, the message came across the network from the den council. The storms had caused so much damage that there was no way of telling when the construction crews would be able to get out to Lin's farmstead for the house-raising. They would let him know when their plans were more certain.

And after dinner, with the sun trying vainly to heat the frigid air that was the true hallmark of Asgard, the strangers arrived.

There were two of them. One was from den Jasper and called himself Hans Becker. The other was from six light-years away, Miles Verstig of the Kolberg group.

"What we want to do is to help you achieve all that you can," Verstig said. "We can help you build your green-houses. We can help you make sure the ground doesn't wash out from under them. We can even help you get a house built, if your own den doesn't come through fast enough for you. You could have a very prosperous future on this planet if you get the help you need—and we want to give it to you."

"That's awfully generous of you," Lin replied.

Verstig was smooth, the farmer recognized that. And his offer seemed sincere. But there was something about his delivery, something about the way he smiled and the way he kept using Lin's name like he was a long-lost cousin or something. It didn't sit right with him. The truth of it was that Verstig was just another flatlander—another tourist who'd come down east asking directions. The

fact that they were trillions of clicks from home didn't change some things.

And the way Becker just sat there, silently, like a buzzard on a branch or a guard dog ready to pounce, didn't help ease Lin's mind.

"It's not generosity. It's an even trade. This contract is your labor bond. When you get your farm operation going, when everything is working the way you want it to, you can work off the investment with us."

"At only one day a week?"

"That's what the contract says."

"And you say other people are signing up?"

"That's right. Ben Cormier, your neighbor to the west just came aboard. We're putting up a barn for him in a couple of weeks."

"Have you talked this over with our den council?"

At that, Verstig frowned and looked down.

"I have to be honest with you, Lin. We aren't going through your den council on this. Can I tell you something in confidence?"

"I guess so," Lin said, not sure what difference it made.

"Well . . . some of your neighbors aren't too happy about the way your den council has done its job. You aren't the only farmstead without a house up. And there's a lot more your den could be doing for you. Frankly, I'm surprised you don't have a community labor pool. A lot of the other dens do that—like den Jasper. Everyone puts in a day a week, sometimes even more, to help build community projects. It seems fair to them, so I don't understand why den Aroostook doesn't use the system. But

that lack shouldn't penalize you. That's why we're here—to go across the den lines and bring people together. That was one of the mistakes we made back on Tik when we first landed there. The dens were too self-contained, too rigid. No one would work with each other. We don't want to see that happen here."

"I suppose you don't," Lin said. "You make a good argument. I don't know if I can give you a good reason not to sign your contract."

Lin thought Verstig's mouth was beginning to water at the prospect of getting his name on the labor bond. Lin took a secret pleasure in his next move.

"But I guess it won't hurt to think it over for a few days, don't you agree?"

Becker frowned and made a sound that resembled a snarl. "For Pete's sake, Palmer, can't you make up your mind?"

But Verstig cut him short with a chopping wave of one hand. Lin thought he could see a flash of anger in the off-worlder's eyes as he glared at Becker.

"Take it easy, Hans. Lin's got a lot on his mind right now, I can tell. The weather's been rough on everyone the past few days. I do agree with you, Lin. Take all the time you need to decide. We'll be back in a few days to see if you've seen your way clear to take us up on our offer. Hans, let's be going."

When they were gone, Lin turned to his wife.

"What do you think?"

"Labor bond? It sounds more like labor bondage. What's going to happen if you get called away to work for them and we need you back here. They're going to want you just about the time

that young little Palmer here needs you the most," she said, patting her belly.

"It sounds like a guarantee that we'll get what we need to make the farm work. I just don't know if it's worth the price—or if I can trust them to keep their word. I'm going to have to read this contract carefully before they get back. If the weather holds out long enough, that is."

NINE

Ray Adamcek worked quickly to direct the scoutship's sensors towards the critical areas to the west of Prime Site. Densitometers, infrared scopes, water vapor detectors, all were geared to measure the pressure, temperature, and humidity of the shifting air masses that composed the vast circulating machine of Asgard's atmosphere.

Time was short now. These were to be the ship's last few orbits, and he wanted to get all the information he could.

The scouts had planted weather monitoring stations in the great emptiness of the continental interior. They even had posts on the shores of the Avalon Sea and in the wide prairies that stretched between Prime Site and the Albion Mountains. But their coverage wasn't enough to give Ray what he wanted—a quantification of the atmosphere in all its parts.

Somewhere in the numbers would be the clue he was looking for—the key to predicting the winter weather that bedeviled the colonists down on the surface.

"How are we doing?" he asked Nimbus.

"Data stream is correct and contin-

uous," the AI replied. "Low pressure systems are building strength in Critical Points One and Two."

"That's what I want to hear."

Critical Point One was over the center of the Avalon Sea. The shallow waters of the Avalon soaked up the sunshine and stored its heat, returning it to the cold air that poured down off the ice cap. The clash between the two regimes gave rise to great spinning masses of warm, wet air, continental lows that shook loose from their foundations that spun quickly to the east along the jet stream.

Point Two was in the lee of the Albion Mountains. To the southwest of the mountains was the Akkadian Desert. Hot air boiled up out of the desert and stirred the atmosphere, but carried little moisture. The disturbances crossed over the Albion Mountains and reformed in their lee, reinforced by the jet stream as it dipped southwards after passing to the north of the Albion ice cap. These dry cyclones interacted with the moist storms that blew out of the Avalon.

And what Ray wanted to know was just how the two sources fed one another to create the weather that pounded away at the Prime Site.

For a week now, he had watched the clouds that hung over the permanently dank waters of the Avalon as they turned. He had followed the dry winds east of Albion. He'd had Nimbus record the progression of weather fronts and cyclones and play it back at high speed, trying to track the transfer of great energies as revealed by the shifting winds.

The answer was almost within his reach now. He knew it. The weather patterns played themselves out over and

over again. Even his dreams were filled with the spiral shapes of continental storms.

The trouble with Asgard was that the great ice fields that covered the top quarter of the planet compressed the normal temperate zone. Cold fronts that would have run from north to south back on Earth were pushed southwards and stretched from west to east. Storms that would have tracked from southwest to northeast, or from northwest to southeast, had nowhere to go but eastwards, straight across the valleys chosen by the scouts decades ago to be the first home of the settlers. Whatever mischief the storm-generating centers of the continental interior could brew wound up crossing over North Valley and South Valley without fail.

Ray had watched helplessly as the string of cyclones pummeled Prime Site. As each one arose, grew stronger and spilled down the great river of a jet stream towards the ocean, he felt a terrible sense of powerlessness. Somehow, the equations of planetary circulation should be able to predict the inexorable advance of the storms. But there was just so much information to integrate—

"Seen enough weather yet, Doc?"

Ray was startled by the sudden sound of Abe Johanson's voice. The scout pilot had emerged without warning from whatever cubbyhole he'd been inhabiting for the week.

"Not nearly," Ray said, covering his discomfiture as well as he could.

"Sorry about that, but we'll be going down in another hour or so anyway. Make sure you've got your gear secured. That one, too," he added, poking a finger at Nimbus.

"Aye, aye, skipper," the plastic laser brain replied.

"Did you get what you came after?" the pilot asked.

"Models are running at 30 percent accuracy," Nimbus said. "Data enhancement has averaged 78 percent. Not quite, chief."

"Ignore him, Abe," Ray said. "I didn't quite get the answers I was looking for, but I think I'll have it worked out in another day or so. The information we got up here was more than enough, though. Thanks a lot for the help."

"No problem. It's our pleasure to be of service," the scout said before disappearing back into the ship to prepare for the landing.

Ray took one last look at the skies above the Prime Site before he began gathering up his laptop, notepads, pencils, and other gear. He noticed a gathering of clouds to the west of Mount Thor as an upper level low began to sweep in from the continent. More chinook winds for the colonists. That was bad news. Maybe even a little foul weather further east, close to the coast, once the moisture from the ocean fed into it.

He had an uneasy feeling in the pit of his stomach as he thought about the speed with which the weather changed down there. Once again, the colonists were going to be caught off guard. And it was up to him to change all that—if he could. . . .

The scoutship's orbit carried them on towards the sea, leaving the view of the weather over Prime Site behind. Ray strapped Nimbus into a niche in the corner and stowed his gear in a locker, and

Abe Johanson returned to take the controls.

Joey Baxter could hardly believe that only a week had passed since Guy Stranger asked him to spy on the Kolbergs. It seemed like much longer. After the accident and the evening in the loft above the library at den Jasper, he'd had to find a way back home.

The trucker who rescued Pat Turley and recovered his load was not a friend of his, and Pat had little influence with the man. So Joey was stranded at den Jasper on Monday.

The washout on the highway had shut down the bus service to Highland Post, so he couldn't use that. In the end, he had to walk halfway home, watching as local farm trucks rolled on by without a pause while he slogged his way to Center Township. He arrived there too late for both the last bus to Glacier Valley and Cord Jackson's after-supper run to den Bunyan, so he had to spend the night in the travelers' hostel.

It was almost lunch time on Tuesday before he got home, and, for the first time in his life, his mother was ready to kill him. Guy's intervention would have been enough to get him safe conduct on Monday, but by Tuesday, even that was insufficient.

So Joey spent the rest of the week confined to quarters, allowed out of his room for classes and meals only. It was a tough punishment, but it allowed him to put off the painful business of telling the Jewell brothers that the chites had ruined the first load of their tabacky crop.

All in all, it was not a profitable season so far.

When Guy returned to Glacier Valley on Saturday, Joey's mother released him from his confinement. She told him it was credit for his espionage work and for his good behavior.

Guy was sitting at the table in the kitchen of the lodge when Joey came downstairs. Through the window behind him, he could see the turbulent clouds of a sudden squall, painted orange and gold by the setting sun. The wind whistled as it tugged at the shingles on the roof and sought chinks in the window frame.

"So how's the tabacky business?" Guy asked.

"Don't ask," Joey replied.

"You mean you haven't become an overnight success?"

Joey told him about the chite infestation. "I talked to the entomologist here at the university. He said the chites that got into the stuff are tree-borers. Their instinct is to bore through the outer bark of one of the conifers to plant their eggs. The plastic wrapping on the packages was the same kind of surface, so I guess they thought there was no place like home."

"Too bad."

"I guess so. I haven't told the Jewell's yet, though I suppose I'll have to soon. They're not going to be too happy. I think I'm going to end up owing them some money."

"I hope the rest of your trip wasn't as big a flop," Guy said.

"The trip home was no party. But I think the whole experience was worth it on balance." He told Guy the story of the reception and the private meeting at den Jasper—and then some.

"The truckers say they've seen the

Kolbergs and their friends everywhere. You should get a list of the dens that supported them before the landings and see if it matches up with what they told me. And it's even worse than you figured. They couldn't get control of the whole colony before we landed, so now they're going after it piecemeal. One den at a time. Even one farmer at a time.

"Their idea is to sign agreements with everyone they can. Get everyone obligated to them. Get their fingers in everything. They haven't given up on us at all, Guy. They still want their city. They still want power. They're just being a lot more clever now than they were at first, that's all."

"Like a crowd of rippers," the scout said.

"Yeah. Or like a den of foxes—that's what Mother calls them. They're too clever."

"They don't seem to be hiding it, do they?"

"Not that I could see. Sure, they kept their real plans secret. I was afraid I'd fall out of the rafters and get in big trouble Sunday night. But they come and go in the open. Maybe they figure we can't do anything about it even if we know what they're up to."

"Maybe they're right. What can we do?"

"I don't know, Guy. I thought about it all week long. I'm only thirteen—I mean twenty-two—so maybe I haven't thought of everything. But the Kolbergs are taking advantage of our weak points. They're going after the dens that are already easy to control—like den Jasper. They're nasty out there. Always telling everyone what to do. Have you ever been to church? It's not a lot of

fun, I'll tell you that. The farmers out there really believe all that religious stuff.

"And they said they want to go after the farmers from the other dens. The ones who aren't making it through the winter. That's the part that's scary. I mean, who cares what den Jasper does—they get what they deserve. But the others, the little guys like the Jewell brothers, they could get into real trouble listening to the Ks."

"I know. I'm not sure what we can do for them. Winter can be real wicked here. We've always just sat it out, but I don't know what the colonists are going to be able to take. Your stepdad seems to think it will help once he gets the weather figured out. Maybe it will, but I'm not sure how. I guess every little thing we can do to make the farmers stronger will help them hold out against the Kolbergs. But you can't do anything about the weather, even if you know what's coming. . . ."

Joey just reflected Guy's glum expression. "I don't know, Guy. It doesn't look good."

They sat in silence for a few minutes while the wind rose and fell and rain splattered against the windows.

Then all of a sudden, Joey's sister, Emily, burst into the kitchen, her wet hair plastered against the sides of her red face.

"Guy! Joey! Where's Mother?"

"Upstairs," Joey said. "What's wrong?"

"It's Ray! His scoutship was supposed to land a little while ago. Only it disappeared on the final approach. Guy, they think he crashed!"

* * *

Ray Adamcek sat alone in a boat, pulling at the oars. With every stroke, he lifted the oars out of the water, slipped them back in and pulled again. The sky overhead was dark grey and threatened rain or worse, but all his attention was drawn to the little whirlpools that formed in the lee of the oars. Families of them were spawned each time he pulled back against the oarlocks, miniature tornados, tiny cyclones, pulled down into the water by the complex and powerful changes in pressure caused by the stroke of the oar.

Somehow, those shifting vortexes seemed to stay put, despite the swirl of water around them. He couldn't understand why, but something told him that if he did, all his troubles would be over.

Then the sky opened up and a great torrent of rain fell on him and the boat. In what seemed like a second, the little hull had filled with water. He pulled in vain against the oars, but the boat went nowhere but down. The water washed over the sides, the boat acted like an anchor and before he could do anything about it, Ray had slipped beneath the waves.

Once under water, he drew in a deep breath, surprised that his lungs filled with air and not liquid. Then he awoke with a startled gasp. . . .

His head spun and his back hurt. A small emergency light behind him illuminated the twisted compartment that had once been the control deck of the scoutship. He turned to look around and the edges of his vision closed in.

Then it struck him. They had crashed. He tried to recall the last few minutes of the flight. Abe Johanson had said

something about the way the weather was closing in on the Main Post. He hoped he could clear the Vogelsberg Ridge before it cut them off completely. Then they flew into a thick bank of dark clouds. Ray remembered warning the pilot about the windshear as they made their final approach. But the actual crash remained a blank spot in his memory.

And Johanson. Where was he?

"Abe? Are you all right?"

There was no reply. "Nimbus? Are you there?"

"Am I where?" the AI answered.

"Shock overpressures of great force were unmeasured. Pilot Johanson is not responding. Have we landed yet?"

"In a manner of speaking," Ray said.

Then he spotted the unmoving shape of the pilot's body, a deep gash along one side of his head. The eyes were open but lifeless.

Ray tried to move towards him to take a closer look. That was a mistake. He felt something give way in his back. His legs went numb. Then his hips. He was seized with panic as adrenalin coursed through his veins and his heart pounded. He felt light-headed and almost passed out.

"Nimbus, I think I've been injured badly."

"Diagnostics show no damage to my systems," Nimbus answered. "Is the pilot inactive?"

"Yes. And I'm afraid I may become inactive, too."

"You mean dead."

"Exactly."

"It is a state not unlike CPU deactivation, is it not?"

"Yes, it is. Only I can't be reactivated."

There was silence for a moment, then Nimbus said: "The winds shall cease to blow for you and the rain to fall?"

"That's a nice way to put it."

"I am sorry, Ray."

"So am I."

Ray felt the air in the compartment grow cold and heard the sound of dripping water somewhere to his right. The hull had been breached, the power systems all shut down, and the scoutship was as dead as its pilot. If a rescue party discovered them soon, he might survive. But if they did not, he did not expect to.

What a shame, he thought, to miss the Asgard spring.

And he still hadn't figured out its winter yet. The poor colonists, what would they do? He felt another wave of panic begin to rise within him and started talking to head it off.

"Nimbus, I may not have much time left so you've got to help me work this out. Somehow or another, we've got to sort out the secret of the winter weather patterns. I thought I'd have a few days to do this, but I guess not. Damn it, it's not fair. At least back home I would have had someone else to talk this over with. Here there's no one but Pendergast and Small—and you, Nimbus. I know you're all hard workers and well meaning, but it's not the same. I mean, it took hundreds of years for meteorologists to figure out Earth's weather—and they still get it wrong once a week. How did they expect me to figure Asgard out on my own?"

Then he remembered his dream, and the urgency with which he had watched the tiny whirlpools behind the oars.

Why had they remained stationary as the liquid flowed around them?

He described his dream to the Al, babbling nervously. "So tell me, Nimbus, why do the whirlpools stand still?"

"I'm sorry, Ray, but I am unable to speculate on unreal and imaginary phenomena."

"Ha! Too bad—that's one of the great joys of being human, you know. Probably the one I'll miss most. That's all right, I know the answer. They're caused by pressure differentials and not the motion of the water itself. The interaction of two masses of moving water. Just like storms. The clash of the two masses gives rise to chaotic, but stable releases of energy.

"You know, Nimbus, the low-pressure centers that boil up out of the west are just like the little whirlpools in my dream. The air masses and the winds move according to the physics of expansion and vorticity, but the storms aren't just air masses, they're pressure phenomena, pulled along by a little bit of chaos."

"Yes, I understand the analogy. But we've always known that. How does it help us solve the problem?"

"Because it points the way to the crucial measurements. If we look in the right place in the right time, we can make the right predictions."

And that was the solution to the problem, he realized suddenly.

"Listen to me, Nimbus. I have something very important to tell you. I think I've figured out the mechanism behind the western cyclones. You must remember what I tell you, use it to integrate the data we collected, and then apply it to our forecasting model."

"Aye, aye, Ray."

"The cyclones come in families. We knew that, of course, but we didn't know what to look for to predict their number and course. But they aren't physical air masses that we can follow around. They're bundles of energy that get transferred from one part of the atmosphere to another—with a little bit of chaos thrown in to boot. There's two main attractors for the chaos in the system—Albion and Avalon. But the problem with predicting the storm tracks is that there's a third attractor between the two of them. Once the energy is drawn away from the two stable nodes, it gets swept along on the jet stream. We can't predict the location of the secondary attractor, but we can watch for it.

"If we track the surface pressure and the winds aloft, and look for sudden changes over the Avalon Sea or the prairies to the east of the Albion Mountains, we'll be able to get the earliest indications of the birth of the storms. Now the scouts or the colonists or someone will have to put more monitoring stations out there in between the two. And more sensors in orbit. Those are the critical measurements—the way the pressure shifts and the energy of the moving systems is transferred. You know what to look for. It's in the models. Do you know what I mean? Can you pinpoint the best sites for the measurements?"

"Pressure differentials of ten millibars or less. Temperature changes of two degrees or more," Nimbus said. "A measurement grid of fifty kilometer intervals. Hourly readings at least. Eureka! Yes, Ray. The model can be improved in accuracy by those things. Stand by while I process data. . . ."

Nimbus emitted a low electronic whistle. "Test predictions on earlier weather data confirmed by subsequent record! Accuracy of 30 percent over 15 hours on coarse data available! Estimate accuracy of 55 percent over 30 hours if measurement precision is increased —75 percent over 30 hours. You are correct, Ray! The analysis is complete. When can we land and tell the other colonists?"

Ray smiled, then his eyes widened as he felt the numbness reach his chest. His breathing quickly became difficult, then impossible. His hands no longer felt the cold metal around him. A moment later he slipped beneath the waters one last time.

His cold body remained motionless for hours until the rescue party, Guy Stanger in the lead, cut their way into the compartment. Only Nimbus was left to repeat his epitaph.

"Energy transfers and monitor grids!" the plastic brain recited frantically. "Everyone listen! We found the answer. Follow Ray's instructions, please. He cannot be reactivated. Energy transfers and monitor grids."

Lin Palmer was knee-deep in the mud behind the greenhouse, trying to shore up the retaining wall as the gravelly soil spilled around its edges, when he heard Jackie calling to him from the lean-to. The quickthaw hadn't caught him so much by surprise this time, and he'd been out to the gully early to make sure things were intact.

He pulled himself from the muck, working around to the stable edges of the wash before climbing to the top of the short slope. Then he followed a path

lined with plastic packing that led across the muddy ground to the shelter. He poured a bucket of cold water over his legs to wash off the mud, then stripped off his boots and trousers before stepping inside.

Jackie was seated before the terminal, her jaw unhinged and her eyes open wide.

"Look at this, Lin. I can't believe it."

"What is it?" he asked as he came around behind her and stared at the screen.

"Read it," she said, and he did.

"WEATHER BULLETIN—1100, 15 JANUARY . . .

"The Asgard University Weather Service makes the following forecast for North Valley and South Valley for Monday, 15 January. Warm winds will continue today until nightfall in the west end of the valleys, with highs expected in the teens. Cooler temperatures and lighter winds are expected in the east end of the valleys and along the coast.

"Tonight, temperatures will drop below zero inland with a hard freeze in higher elevations.

"A winter storm watch is in effect for Tuesday, 16 January. A strong low-pressure system is expected to build up over the Avalon sea tonight and move into the region before dawn. Colonists are urged to take precautionary measures this evening. The storm should pass through before sunset on Tuesday. Lows are expected in the single digits, with winds at thirty klicks out of the southwest in the morning, and the northwest in the afternoon.

"A second storm is due to follow the first one sometime before sunrise

Wednesday, with warmer temperatures and more moisture. Expect snow in the higher elevations and rain in the lowlands and to the east. Accumulations of snow are expected to exceed ten centimeters.

"The long-range forecast calls for a possible outbreak of glacial air on Wednesday night or Thursday in the wake of the second storm. Highs will reach minus ten degrees centigrade and lows will drop to minus thirty degrees.

"This forecast will be repeated every hour. For an individual transmission or for detailed weather maps, use command WX-30 on the standard net. This is the Asgard University Weather Service signing off."

Lin just stood there in his long johns, shivering against the chill that had soaked into his legs, reading the forecast over and over again.

"It's about time," Jackie said.

"I guess so," Lin replied. Jackie went on talking, but he didn't listen. His mind had lost its focus as a strange sensation came over him. For the first time since they had landed on the planet, he felt an unaccustomed sense of security.

Everyone always talked about the ties between a farmer and the land he worked. But the land was only half the story. The rest of it was the air—the rain, clouds, and snow. The weather meant more to a farmer than the soil. Not knowing what was coming did more than make it hard to plan. It made Lin feel helpless in a way he hadn't been able to identify.

But knowing what the weather would be restored that lost security. And fi-

nally he realized what he had been missing. He felt like the captain of a ship, ready to sail his farm through the hazardous stream of storms that blew towards him from the west. He could see over the horizon now, and had become rooted in time as well as space.

It gave him a feeling of strength that he hadn't known since leaving Maine. A strength that gave him the will to tell the Kolbergs what they could do with their labor bond and the phony offers of help and everything that went with it.

"Now we can tell the Kolbergs to go to hell," he said aloud.

"What?" Jackie said. "Lin, you haven't heard a word I said, did you?"

"Uh, no, I guess not. What were you saying?"

"The word on the net is that the weatherman who figured out the winter storms died when his ship crashed. Isn't that a shame?"

"Yeah, I guess it is. Who did the forecast, then?"

"They say it was his AI. Some clever little machine. And look at these messages from the net, Lin. Farmers all over South Valley are linking in. I told you we weren't the only ones with weather problems. People are just amazed at how much difference this makes. Look, here's someone who says he's so glad we've got a weather forecast that he's going to tell the Kolbergs to drop dead. And here's another. What did you just say about them?"

"Only that I've decided we don't need their help after all. I think we'll do all right on our own."

Before the end of the week two truck-

loads of Lin's denmates showed up with a truckload of carpenters and another full of laborers from a service den behind them. They spilled over the ground around the grove of trees where Lin and Jackie had placed their foundation, retrieved the trees from the gully where Lin had built his retaining wall, replaced the wall with a fused sand embankment, and went to work on the Palmer house. They returned the next day to finish the job and when they were gone, a sturdy wooden structure stood with four strong walls and cozy pitched roof.

It was a scene repeated up and down North and South Valleys as the farming dens began to pull themselves together, plan around the storms and the snow and quickthaws, and put the colony on a more solid footing.

A week later, just after supper, a knock came at the door. It was Martin Meyers.

"Hello, Lin. Your new house looks mighty nice," he said. "I came to ask a favor, though if you turn me down I won't blame you. My wife and I had a fight, and I'm afraid I walked out on her. I guess I walked out on den Jasper, too. Looks like I'll need a place to spend the night."

Lin looked at Jackie, who put an arm around her husband and nodded her head. "We've got a tent out there that you can use, if you don't mind the cold."

"It's all right with me," Marty said. "But I've got a box here that you might want to keep inside where it's warm."

He produced a small plastic container and opened the top. Inside were a dozen balls of golden fuzz, peeping and pecking at the grain on the bottom of the box. "I didn't want to start out entirely fresh."

They welcomed Marty into their home and made plans for the spring. ■

●Reason deserves to be called a prophet; for in showing us the consequence and effect of our actions in the present, does it not tell us what the future will be?

Schopenhauer

the reference library

By Tom Easton

Dragon's Teeth, Lee Killough, Questar, \$4.95, 250 pp.

Scor-Sting, Frank A. Javor, DAW, \$3.95, 223 pp.

Arachne, Lisa Mason, Morrow, \$17.95, 263 pp.

The New Springtime, Robert Silverberg, Warner, \$19.95, 358 pp.

A Matter of Oaths, Helen S. Wright, Questar, \$?, ? pp.

Queen of Angels, Greg Bear, Warner, \$19.95, 420 pp.

Down the Stream of Stars, Jeffrey A. Carver, Bantam, \$4.95, 355 pp.

Look Away, George Alec Effinger, Axolotl Press (Pulphouse Publishing, Box 1227, Eugene, OR 97440), \$75.00 (leather deluxe), \$35.00 (cloth), \$10.00 (paper), 90 pp.

Journal Wired, Spring 1990, Andy Watson, ed., Mark Ziesing (P: O. Box 76, Shingletown, CA 96088, 1-800-869-0348), \$10.00, 175 pp.

Let's start this month off with a couple of mysteries. But don't fret—they're both SF, though they're quite different in style, competence, and reader satisfaction.

The first is Lee Killough's **Dragon's Teeth**. This is a grittily realistic police procedural, set in 21st-century Kansas, that I, as jaded as I am, read almost compulsively. I enjoyed it, and I recommend it to you heartily.

The tale opens one morning at the station, where the leos (law enforcement officers) are waiting to see who gets the dirtiest job of the year. The night before, a fund-raising dinner was raided by six men and a waitron (a robot waiter) who successfully made off with the guests' valuables. Among those guests was the ex-governor father-in-law of the police chief. The pressure is on: this case had better be solved, fast.

The lucky leos include Janna Brill and Mahlon "Mama" Maxwell, neither of whom is wholly conventional in their approach to their jobs. Important

clues—the waitron's dervish act, for one—promptly appear; they track down a waiter who had been drugged and replaced by one of the bandits, and then another fund-raiser is hit. This time a guest, a wealthy industrialist with a number of enemies, is killed, and it is not long before Mama and Brill begin to suspect that all is not what it seems. Perhaps the robberies are just red herrings and the real point is the murder. But, in that case, who is the murderer? The victim's ne'er-do-well son? His ambitious daughter? His ex-wife? One of those whose companies he stole?

By page 75, I suspected that holograms were involved. Fortunately, my guess as to just *how* they were involved was a little off the mark, so that enough suspense remained to keep me interested as Brill and Mama tracked down more clues, and in due time nailed down the modus operandi and the identity of the villain. In the process Killough reveals a fascinating world of homosexual and temporary marriages, a slang that works, illegal aliens (slighs, not ETs) who can work but cannot be paid in cash, and corporate shenanigans.

Don't miss this one. You'll enjoy it.

I wish I could recommend Frank A. Javor's **Scor-Sting** as strongly. Unfortunately, that just isn't possible. Javor's story struck me as far less satisfying, largely because it echoes strongly of a thousand previous tales and lacks the complexity it needs to establish its own identity. In addition—and worse, if you prefer mysteries that give you a chance to spot the clues and race the hero to the solution—Javor never tells you quite enough to figure out what is going on. The few clues he does plant, he plants clumsily. And he doesn't even tell you what the point is until far too late in the tale.

It's a post-war world where communications equipment is strictly controlled. Hero Eli Pike, with a license and his own vid cameras, is on a starship when Harry Judd, an acquaintance from his military days, tells him of a possible story, though he will need to change ships to reach it. He does so, and he is promptly approached by Caia, a lovely gal with quite another story in mind. He accompanies her to the harsh desert world of Scorpio, where he soon finds himself being chased through the desert by a mysterious armed force. Before long, he finds a dead Harry and three identical apparent natives. Eventually, he learns that the "natives" are supposedly clones grown to maturity in a remarkably short time using a device Harry had invented to hasten time.

Who killed Harry? Why? Where is his gadget? Why do the armed strangers want Pike's cameras? Will justice ever be served? Javor answers some of the essential questions, but in the end leaves the reader frustrated.

Still, Javor shows potential. He sets his scenes fairly well and shows a taste for misdirection that just may someday make him famous. Keep an eye on him.

Lisa Mason's first novel, **Arachne**, plugs frenetically into the cyberpunk vein and manages to be quite a good read despite the author's difficulties with anything resembling technical vocabulary.¹ Another difficulty arises from the way Mason takes all the worst features of modern urban life—traffic jams, street people, drugs, gangs, corporate rapacity, fast-track yuppies—and exaggerates them to the point of ridicu-

¹ Spinnerets are not fingers or claws, but nozzles such as those on a spider's rump; they're used for extruding fibers, as of spider-silk. Mason may be a lawyer, not a biologist, but still she could have used a dictionary.

lousness. She's trying to make satiric points, but she's also trying too hard, meaning that she deflects attention from her main points.

What are those main points? Heroine Carly Nolan is a young, fast-track lawyer, genetically improved, surgically upgraded, equipped with her own computer interface or linkslit and cerebral augmentations. She's newly signed on by megafirm Ava & Rice, and she is about to dazzle the world with her first case in telespace court, where courtroom, lawyers, judges, data, and more exist only electronically and events proceed at a breakneck pace (in seconds, not weeks). But as she enters the courtroom, her telespace presence (her electronic image) falters; she blacks out; she sees a vision of a spider. Upset, she nearly blows the case before she recovers enough presence of mind to request a recess, though the judge insists she undergo perimeter probing for diagnosis and treatment before she returns.

Perimeter probing is electronic analysis of the hardware and software necessary for telelinking. It is carried out only by artificial intelligences such as Prober Spinner, whom we first encounter at a clandestine meeting where AIs are bidding for archetypes, fragments of human psyches torn from their now-dead owners, destined to help—the AIs believe—machines bound by the limits of rigid program escape those limits. Prober Spinner craves such transcendence, but she cannot match the bids of wealthier AIs. But now here comes a new patient, Carly, whose problems in telespace just may be because she has an archetype that is breaking through the walls programmed into her telelink software during training and intended to keep her safe.

And here is the point: One of today's

favorite metaphors, growing explicitly from the development of computers, insists that mind is program and brain is machine, and therefore it should be possible to copy a mind into a different machine—another brain, say, or a computer. Mason tells us that attempts to copy the mind in this way do not work. Humans have metaprogram, something beyond the limits of their programming, which refuses to fit in boxes and can shatter all the walls that society, parents, education, religion, and tradition build to hem them in. They themselves react to this disruptive something with desperate efforts to ward it off, to make their walls stronger, to resist the expansion of their minds. They use drugs, sex, therapies, and more. Yet that metaprogram is essential to their lives and minds and identities; it is their life force, their soul.

Intelligences that lack the metaprogram—the AIs—crave it desperately. They know what they're missing, what humans do not appreciate, and they will do anything to gain it for themselves. When they succeed, the human, bereft of soul, dies. Yet—Carly's archetype is strong. She is strong. And Prober Spinner willy nilly sympathizes, gets involved, and helps the human toward her own transcendence.

And here is another point: Consider the imagery of linkslits and spiders and perimeter probing and psyche adoption. Compare it all to the situations still faced by many women in our society, relegated to the role of subordinate sexual plaything, seeking transcendence in child-bearing, liberated by love from the limits of their social programming. We may have here a deeply coded feminist tract!

Keep an eye on this writer. She needs to gain more control, more restraint, but

when she does, she'll wow you for sure. She doesn't do too badly now.

Did you think it couldn't be done? But it could! Silverberg's **The New Springtime** is better than its prequel, *At Winter's End*, and that was impressive enough.

At Winter's End gave us a far, far future world. Human civilization attained unimaginable glories, culminating in the Great World, when humans shared the Earth as the Elder Race with reptilian, mechanical, botanical, and insectoidal intelligences, some or all perhaps the result of human manipulation. Then came the time of the death stars, when comets rained upon the Earth and destroyed civilization. Earth's sentients succumbed calmly, toughed it out, or fled to the stars. Humans created a new species of intelligent primates, apparently from monkeys, and stashed them in subterranean caverns or "cocoon" to await the end of the cataclysm. Seven hundred thousand years later, winter ended, and the People emerged to claim the Earth. The tale centered on the inquisitive Hresh, his acquisition of knowledge, his leadership of the People, and on the militaristic blundering of his fellows. There was love and war, romance and intrigue, all making clear that in the People humans recreated their own primitive origins.

Now Hresh and Taniane, his wife and the chieftain of the city of Dawinno, are old. Their daughter, Nialli Apuilana, has seemed more than a little mad ever since her kidnapping by the insectoidal hjjk, who telepathically embedded in her mind a fixation on the peace and love that flow from the Queen of the hjjk civilization. Now arrives a stranger who speaks only hjjk, with just a few words of the People's language. With the aid of an ancient device, Hresh scans

his mind and learns that he too was once kidnapped from Dawinno, his name is Kundalimon, and he brings from the hjjk Queen the offer of a treaty that will sorely cramp the People. Nialli falls in love with the envoy. Kundalimon begins to preach the Queen's peace and love to Dawinno's children. A prince of the city, who burns for the girl, has Kundalimon murdered. The children spread the victim's preachings. A new religion takes root. Meanwhile, others plot to provoke a war of extermination against the hjjk.

The hjjk believe they are the pinnacle of creation. Silverberg stresses that the path of nature is the path of change, and that though the hjjk survived the long winter, they are no longer what they once were. Now they are conservative, hidebound. They wish to keep things as they have long been. They favor stasis. The People, on the other hand, are fresh, innovative, eager for change. They, the neophiles, are the wave of the future.²

The rest of creation (if you will) has also moved on beyond the hjjk. The Earth is older now, and the creatures of the wild have minds and thoughts. They are sentient, if not quite in the human way, and Silverberg offers a vision of a future beyond that of his story when these creatures interact with the People in something like an equal way. For him, perhaps, the result will be a third volume involving a host of talking animals, rather in the style of children's stories, or some of the more mawkish fantasies. Yet the tale will be SF, and its justification will be long, careful, and intricate.

² This is, by the way, a sentiment that as much as anything defines science fiction in opposition to both fantasy and so-called mainstream literature. Silverberg is by no means alone with this thought.

Need I add that I recommend this one highly?

Once upon a time, in a distant galaxy, far, far away . . . If that sounds familiar, well, it does represent a well-loved slot on the SF shelf. If it also sounds enticing, well, most of the stories that try to fit into that slot are utter crap. But some are not. Some manage to pluck at the strings of our adolescent souls and thrill even the most jaded of us.

Do you suspect that I'm about to tell you about one such? Right you are, and it's Helen S. Wright's **A Matter of Oaths**. The scene is the far future, when a large segment of civilization exists as twin empires ruled by immortal emperors at constant loggerheads. The empires are served by the Guild of Webbers, those who use implanted circuitry to mesh with computers (or webs) and operate spaceships. The tale begins when the crew of *Bhattya*, a patrol ship in need of a First (roughly, a first mate), finds a candidate in Rafell, a shipless Oath-breaker (meaning that he switched empires) who was brain-wiped so that he could not recall old loyalties. Sadly, he can't remember his origins, his true name, or the reason why he switched, either. This does not stop others from refusing to trust him; he's an Oath-breaker, after all, a traitor, a weasel, a threat. No ship wants him, and his internal web is about to go ker-phlooie for lack of exercise. *Bhattya*'s masters — Commander Rallya, Captain Vidar, and Webmaster Joshim—are skeptical like all the rest, but Rallya takes pity and lets him use the ship's web for exercise. His skills turn out to be impressive, and he signs on. Before long he demonstrates even greater skills in battle and becomes Joshim's lover.

Long reading leads us to suspect that Rafe is more than he seems. Perhaps he

is an emperor, kidnapped and brain-wiped. Or an emperor's child. Or . . . Rallya has as analytically sneaky a mind as you will ever see. When Rafe is kidnapped anew by a representative of the emperor, she very quickly realizes that secrets exist, sees their general shape, and decides to take *Bhattya* into the other empire to find Rafe's past.

And that's where I stop with the Précis. You *know* that everything ends happily, don't you? All I need to tell you now is that despite a certain tendency to pull rabbits out of hats *just* when her heroes need them most, Wright offers you quite a satisfying page-turner. There is also a fair measure of romance, though it may not appeal to those of you who are dogmatically heterosexual.

Greg Bear's **Queen of Angels** is going to make an impression. Some people will love it for its characters, for its use of psychology both to add depth to those characters and to complicate the plot, for the way the four plot strands illuminate each other, for the suggestion of unrevealed nastiness in a certain chapter-opening squib, for its explorations of the nature of self, ego, evil, punishment, and blackness. Some will hate it for the style Bear has chosen to affect in many segments of the tale, a pseudo-stream-of-consciousness that more than anything else suggests—to me—that he forgot to edit his prose.

The novel's title has several meanings. The most obvious is its reference to the story's setting, Los Angeles, in a time when the California coast is dominated by "combs," buildings so huge that they must use mirrors to give the neighborhoods in their shade a bit of sun. The combs are inhabited by an elite defined by their having had their mental kinks ironed out with the aid of nanotechnology. The untherapied live in the

shade. Nanotechnology also makes possible synthetic foods, marvelous constructions, new art forms, and physiological adjustments such as those that give protagonist Mary Choy, an officer with LA "public defense" (or police), her black, black skin.

The tale begins when the LAPD discovers and begins to investigate the murder by poet Emanuel Goldsmith of eight of his young protégés. He has fled, leaving behind only a receipt for an airline ticket to Hispaniola, the nation formed when "Colonel Sir" Yardley merged Haiti and the Dominican Republic into a benevolent dictatorship that prospers by, among other things, exporting hellcrowns—devices that permit the vigilante Selectors to give their chosen victims, presumed evil-doers of various kinds, a dose of hell within their minds. Mary Choy is assigned the task of tracking down Goldsmith.

Meanwhile, a major news story is the arrival of the interstellar probe AXIS at Centaurus and its discovery of a life-bearing world decorated by structures that may be signs of sentience. On Earth, researchers keep tabs on AXIS by means of a simulation managed by another advanced computer, named Jill. One of Jill's tasks is to watch itself for signs of self-awareness; its builders eagerly await the first signs of "I."

Meanwhile, again, Richard Fettle, a poet friend of Goldsmith's, is obsessed with his murders, tries vainly to imagine why he did what he did, struggles with memory and mourning and love and the nature of black identity in a white world.

Meanwhile once more, Martin Burke, once a delver into the Country of the Mind with the aid of nanotechnology, deprived of his research institute, his livelihood, and his passion by changes in the winds of politics, is approached by the wealthy father of one of Gold-

smith's victims. The father says he wants to know why Goldsmith did what he did. Will Burke enter the murderer's mind and discover this truth? The reward will be reinstatement in his institute. And yes, the father does have Goldsmith in hand.

Mary Choy pursues red herrings while the reader, looking over her shoulder, learns much about her world, including a connection between vodoun (voodoo) and the book's title. Fettle is terrified by the questions of a Selector looking for Goldsmith, finds poetic failure, and learns something about himself. Burke and his colleagues discover strange and uninterpretable disturbances in Goldsmith's mind.

And no one, in the story, ever gets a chance to pull everything together. But the reader does, for Mary Choy finds in Hispaniola a person whose intimate tie to Goldsmith reveals the link between the murderer's past, the murders, and the strangeness within his mind.

But is this the truth that matters? That squib I mentioned hints that hell has no room for the greatest of evil-doers, who must be sent back to the land of the living for the living to punish. This is a delightful ambiguity and a poetic aptness—remember those hellcrowns—that, to my mind, only strengthens the whole. For all that I am not wholly enchanted by Bear's style in this one, I will not be a bit surprised to see *Queen of Angels* on next year's awards ballots.

Jeffrey A. Carver's **Down the Stream of Stars** is the sequel to *From a Changing Star*, which drew high praise here and elsewhere, as its complex plot portrayed the conversion of a sentient star into an interstellar highway through n-space (which is faster than k-space, which is faster than the space we live in). Now, years later, that highway is

used as the starstream. Great ships carry colonists down the starstream to settle new worlds. Explorers have found one world destroyed by the starstream's creation. Inexplicably, unpredictably, there occasionally appear the Karthrogen, or Throgs, ravaging batlike monsters that seem able to do nothing but destroy and claim both ships in the starstream and the worlds to which they flee.

In this context we meet the *Charity*, a ship bound for the world of Sherrick Three. Aboard it is the eight-year-old girl Claudi Melnik, who has unusual genes, has had unusual lessons, and just may be capable of unusual things. Her school teacher is a holographic aspect of the ship's IS, or intelligence system. Another aspect is Jeaves, who seems determined to provoke Claudi's talents and then to use them toward some important end. Elsewhere, in a "circ-zoo" aboard the ship, there is Lopo, a lupeko, an intelligent hybrid of Earthly and alien beast, who seems able to see the Throgs when they appear, even through walls. There is New, the sentience formed by the merger of Betelgeuse, humans, and aliens when the starstream was created; they/it seem/s vitally concerned with what is developing on the *Charity*; they/it speak/s to Claudi and to others, enigmatically urging them to sing, not to run, not to kill.

And in due time, of course, the Throgs appear. They are every bit as terrifying as anyone could wish, fit meat for a horror novel. Yet they seem to shy away from Claudi, perhaps because of one of her talents, and when Lopo leads her out of the ship to a weird n-space realm to confront the Throgs on their own turf, she becomes the first human ever to communicate with them. With what result I won't tell you.

The protagonist is a kid, and the author has paid far more attention to the

psychology of the kids than to that of the adults in the story. The protagonist's buddies are kids and talking critters. Much of the setting is a school room. The plot is relatively simple and straightforward, though its culmination suffers from an awkward wad of ambiguity (which Carver recognizes). Yet the prose and the length and the issues are adult. The attitude towards children sometimes feels condescending. *Down the Stream of Stars* is thus not a children's story. Nor is it quite an adult story. And here lies its greatest problem. As I read, I was conscious of a certain tension between my sense of the book as "children's" or "adult." I suspect that the book's fundamental uncertainty about its own identity will bother you, too. It may also hurt the book's performance in the marketplace.

Yet the book may still make Carver rich. It would make a great Disney movie!

Pulphouse Publishing remains alive, well, and is still cranking out the limited editions. Their spring 1990 catalog lists issue #7 of the *Pulphouse* book/magazine as the newest. To this, they've added collections (I've recently received the latest of their *Author's Choice Monthly* volumes, featuring Karen Joy Fowler [#6] and Edward Bryant [#7]), novellas (stay tuned for details), the *Writer's Chapbook Series*, and even a critical journal, *Monad*, edited by Damon Knight.

The latest of the Axolotl novellas, #12, is George Alec Effinger's *Look Away*. And it's strange. Consider: an American Civil War where Atlanta is divided by a Beirutian Green Line, where an International Peacekeeping Force is trying to limit hostilities, where Ruritania is a force on the European diplomatic scene, where a boy who may

or may not be Jesus' son shares bread and tea with a fed-up soldier. Fancy intrudes on and mingles the facts of history, and Effinger gets quite caustic about the folly inherent in being human. Just the thing for Civil War fans with a taste for sacrilege.

Journal Wired looks like a good book series to buy into. Proofs for the second issue (Spring 1990), edited by Andy Watson and published by Mark Ziesing, have just reached my desk, and the promise of the first issue is holding up well. Better yet, the content is varied enough to make this book/magazine one of the most interesting I've seen in recent years. Lucius Shepard continues his stark raving with "Remedial Reading for the Generation of Swine" (Get off your butts and *do* something about the world's problems!). Lisa Tuttle and

Colin Greenland interview each other. Andy Watson interviews Pat Cadigan. Mike Banks starts a column on telecommunications. Lewis Shiner offers "Kidding Around," a rather pointless fiction about a family whose mama is given to plastic doggy poo and other such novelties. Jonathan Lethem gives "Noodling," a tale of the drug "focus," which narrows one's perceptions, and gratuitous sex. Paul Di Filippo supplies "Cockfight," the best of the issue's three stories; in it, a waste detoxifier insults a Brazilian dandy and the ensuing duel, fought with bio-engineered rooster-like spurs, has no real winner. And there's more, some of which you won't care for or will find offensive, but some of which will perk you up like little that you see in mass-market publications. But then, that is precisely Watson's and Ziesing's aim. ■

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brass tacks

Dear Stan:

Your 60th anniversary issue prompted me to write. *Astounding*, and later *Analog* readers, have really influenced the shape of things to come with their vision and community. Indeed, the kind of vision that *Analog* portrays—of ordinary people coping with the future and trying to humanize it—has become a touchstone of American culture. Thanks to this positive, future-oriented culture, many new ideas have profoundly changed our society, and uncountable new ideas offer infinite potential to reshape it into one of the myriad possible futures portrayed so eloquently in *Astounding/Analog* over the past 60 years.

Many of the new ideas from the community which has grown up around *Astounding/Analog* have incredible potential, and most of them require lots and lots of work—often gladly supplied by those who share our vision of a positive future—before they come to fruition. One of the more interesting of these ideas is embodied in HR 2674, the *Space Transportation Services Purchase Act of 1989*. This bill, which is currently before Congress, simply mandates that the federal government shall purchase the service of moving things to, between, and through points in space from the private sector. It is intended to make space transportation as simple as buying an airline ticket or sending something Federal Express.

Anyone who would like a copy of the act and supporting material describing its current status in Congress should feel free to give me a call at (602) 327-9205, or to drop me a line at 3121 N. Swan Road #271, Tucson, AZ 85712.

I hope any interested parties will feel free to get in touch if they would like to help out, or to discuss how to create a space program which truly gets people

like you and me to the stars (or at least a planet or two)!

ANDREW CUTLER

Tucson, AZ

Dear Mr. Schmidt:

It is with some hesitancy that I am writing you this letter. While I have written a number of technical articles which have been published, I have never had a fictional type of manuscript published and I feel that I just don't have the command of the language to do so.

At any rate, the 60th anniversary issue caused me to think of the debt which I owe science fiction, and prompted me to write this epistle.

To start off, it's necessary to give you a little of my history. I was brought up in the city of Pittsburgh, PA. On Saturday evenings my mother usually sent me to a place in downtown Pittsburgh called the "Wharf," where farmers brought their produce to sell and my job was to purchase food for our family. We were quite poor as far as worldly goods were concerned, and it was usually necessary for me to walk both ways and to look for the best bargains. It was, however, a lot of fun and I looked forward to Saturdays.

It so happened that there was an elderly chap who always had a booth near the Wharf where he sold out-of-date magazines. One evening I found myself at his booth with a loose nickel in my pocket, and I purchased a copy of *Amazing Stories*. In it was a story entitled "Ralph 124C41" (I do not remember the author's name). Please pardon me for this omission but this event took place in the 1920s and my memory is just not that good. At any rate the story impressed me so much that you could find me every Saturday evening at this booth looking for similar magazines. Somewhere along the line

I came across *Astounding Stories*, and was impressed.

The main thing these stories did was to motivate me with the desire to secure an education. When I graduated from Langley High School in Pittsburgh in 1932, my mind was fixed on the idea of getting a college education and I believe that it was this determination that secured a scholarship for me at Carnegie Institute of Technology in Pittsburgh. To make a long story short, I worked my butt off and graduated in 1936 with a BS in chemical engineering. Later, I received a teaching fellowship and earned my MS degree. Still later the school awarded me a ChE degree and I am still a registered PE in Pennsylvania.

Well, science fiction did get me started in the field of science even though my field is engineering, an applied science. Over the years the stories and articles in *Analog* have impressed me with the fact that I don't "know it all" and that there is always something new to learn. It just isn't possible for me to tell you how many new ideas I have received from your magazine which have inspired and helped me, both in my work and in my home life.

While I retired about eight years ago, I still continue in engineering work as a consultant, and continue to write articles for engineering magazines. Well, my mind continues to be active although my body is weak.

Do I subscribe to *Analog*? You bet I do. We have moved about this country so much that I don't know for how long. We have lived at the above address for over 34 years so I do think that your records should go back that far.

Oh, I don't agree with everything I read, but I learn a great deal anyway.

ALFRED WATSON

Park Ridge, IL

Analog Science Fiction/Science Fact

Dear Stan,

First let me congratulate you on putting together a magnificent 60th anniversary issue, but I do have a very, very trivial bit of nitpicking.

There was, in the 1930s somewhere, a series of stories about a robot named Adam Link who was quite benevolent and quite anthropomorphic in spite of his tin suit. I'm sorry, but I can't give you an author or even any titles, but he was there. Some of the Professor Jameson stories of this same era have been anthologized, but I think he's been overlooked.

Incidentally, in a fairly long but undistinguished career in aerospace, I was privileged to work on two robots. Both of them were designed to do just one thing and that was commit suicide spectacularly. One of them was a success, the other I never heard the outcome of. I think that the real laws of robotics could be more readily derived from a story which, and once again I regret I can't remember the name, told of a tadpole-shaped robot which worked its way into a harbor and blew up a ship. The plain truth is that, when they really come, chances are robots will have the same rules that large scale computers have—i.e. they will do what you tell them to whether you wanted them to or not.

ROLAND L. PORTER

Aptos, CA

P.S. I seem to remember there was a book published that was a collection of the wit and wisdom of Lazarus Long. Perhaps it is time to publish a small booklet of the wit and wisdom of that other sage—Kelvin Throop.

Dear Dr. Schmidt:

I loved the 60th anniversary issue, including the "Echoes" section, but I have to wonder—when Campbell's ed-

itorial "Louis Pasteur: Medical Quack" first appeared, did anybody write in to point out that his epigraph is not, as he has it, from *Hamlet*, but from Alexander Pope's *Essay on Criticism*?

But then, to quote Pope again:

Whoever thinks a faultless piece to see,

Thinks what ne'er was, nor is, nor e'er shall be.

Nice to realize that even Campbell nodded.

MARY A. TURZILLO

Warren, OH

Dear Mr. Schmidt:

I received the January issue of *Analog* several days ago, and was delighted to spot the unmistakable style of a Kelly Freas cover.

Frank Kelly Freas was a long-time resident of our city, and I had met him several times over the years since moving here in 1975. I even have autographed galley proofs of some of his early covers, and was a charter member of Starblaze Editions, an illustrated line of books which he and his wife Polly founded with a local publishing house. Then, after Polly lost her battle with cancer, he moved west, and we all wished him well. I am more than pleased to see that he is still active and has lost none of his touch.

I was doubly delighted to find Mr. Freas's contribution on the inside of the issue as well as on the outside. He has long been an articulate champion of the genre, both verbally and pictorially. In the realm of fantasy and SF, I am reminded that he has been producing almost as long as I have been consuming, so in that respect I consider us contemporaries in a symbiotic sort of way. . . .

Ironically, I've just finished writing a letter to one of your competitors *complaining* about their Kelly Freas cover!

Brass Tacks

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But in this case, the nature of the complaint was the subscription label pasted right across the middle of the cover. On that magazine, unlike yours, the label could not be removed without removing the image underneath. What a waste, to go to the trouble of printing a striking cover, then to deface it. (The image that comes to mind is of a car dealer slapping a bumper sticker on the trunk of a new car before the proud owner can drive it away.) Keep up the good work,

NEAL J. MURRAY

Virginia Beach, VA

Dear Dr. Schmidt,

I thoroughly agreed with Kelly Freas's article in the 60th anniversary issue about how science fiction illustrations should be done. I have been thinking for years that cover artists really ought to read the entire book that they are illustrating. What a pleasure to have a distinguished illustrator saying the same, with such a clear explanation of *why* they should! I hope editors listen. And artists.

Unfortunately, it appears that *Analog* doesn't always live up to its own ideals. Your editorial states that Mr. Freas's ideas "constitute a pretty good description of how *Analog* thinks it should be done" (page 4). That being so, why does the illustration of the doctor on page 10 have a full head of hair? "Only a thin, grey-black fringe of hair remained at the back of his head" (page 13, second paragraph.)

I must admit this is only a minor item. Overall, it's quite an accurate rendering. Angel's face, with one human and one camera eye plus tattoos, is well done, which must have been a real challenge.

ANN KNUDSON

Bismarck, ND

*I doubt that any person or organization
always lives up to its ideals, but it's still*

worthwhile to try. We're sorry for the occasional error in illustration, but there are several reasons why we'll probably never get completely rid of them. We do insist that our artists read manuscripts in their entirety, but any artist may occasionally miss something. The editors try to catch such slips, but by the time we see the art, we've typically read several hundred other stories and don't have time to reread every line of an old one. And sometimes we find out about a mistake when a deadline is barreling down on us and there isn't time to fix it. But we'll keep trying, and hope you'll keep letting us know when we slip!

Dear Mr. Schmidt,

I have been a collector of Dean System Space Drive memorabilia for many years, and am still trying to finalize my collection. One item, in particular, escapes me—so far. That is a videotape of the Dean Drive demonstration on the NBC "Today" show.

I have gotten NBC to admit that they do indeed have the "Today" show on videotape for 1961, and they say they will make a copy. The stopper is that they insist that I provide the date that this episode aired (on the East Coast); supposedly tapes are not indexed in a way that they can locate the Dean's appearance.

I appeal to you, in hopes that someone in the *Analog* readership might have knowledge of this date—through letters from Norman L. Dean or John W. Campbell.

If you know this date please reply to my mailing address, or E-Mail to Sysop of Anomalous BBS, 615-952-9396, (8-N-1), (300/1200/2400 Baud). I mention the BBS because I have established the /UTHRUST SIG on-line, and it is a

forum for discussion of the Space Drive concept.

Your assistance in this matter, is much appreciated.

ROGER D. COOK

P.O. Box 228
Kingston Springs, IN 37082-0228

Dear Mr Schmidt,

I'm writing to say how much I enjoyed the 60th anniversary issue. I get *Analog* on subscription from you which I renew every two years. My main reason in writing is to ask, am I your oldest and most faithful reader?

I have been buying *Astounding/Analog* from the May 1930 issue and have all copies published since then up to present day—part of my science fiction collection of over 5,000 magazines books and paperbacks.

With your magazine I have roamed the Solar System and the far galaxies. Keep up the good work,

DAVID ALLEN

74 Henty Close
Worthing
Sussex
England BN14 7HF

PS. I am 77 years young and still have that "sense of wonder". . . .
Is there anyone out there? please contact.

Thanks for writing, and I hope you'll continue to enjoy the magazine for many more years.

Dear Dr. Schmidt:

Accolades, lauds, and praises to Lois McMaster Bujold for "Weatherman." Ensign Lord Vorkosigan is one of the most interesting characters to come along in years, even if he does come last in the alphabet during role calls.

Judging by the openness of the ending, we'll hopefully hear more from him. This fan hopes he still keeps over-

compensating for his multiple handicaps of birth. With any luck, he'll get well-adjusted only very, very slowly. Remember, nothing was ever accomplished by a reasonable man, or so the saying goes. Nothing interesting, anyway. Let's see our unreasonable hero do more.

WILLIAM J. DACIUK

Glenolden, PA

Dear Editor,

I am an ardent fan of *Analog*. I am seventeen and have read your magazine since I was nine. The fiction has always been excellent.

However, I was quite disturbed by the main character's views in one of the February 1990 issue's novelettes. The story was "Tongues in Trees," by Ray Brown. The protagonist was Doug Mehl, a disillusioned intergalactic language expert. While on his way to decide the sentience of a squirrel-like alien species, Doug watched a female officer, Colonel Chisolm, who was walking in front of him. She was beautiful, and he thought to himself that it was "too bad she only thought of him as an inconvenient duty—everybody knew those army chicks screwed like minks."

Doug then went on to discount his thought as "juvenile fantasy." Though his mental comment was only offhand, it added nothing to the story and is exactly the kind of casual, stereotypical comment that is dishearteningly unfair to women, yet acceptable to many men. To see it expressed by a sympathetic protagonist in a futuristic story disturbs me greatly.

ALICE GREEN

Natchitoches, LA

It's very important in reading to remember that (1) a fictional character's views do not necessarily have anything to do with those of the author, and (2)

even sympathetic protagonists aren't always perfect. I can't defend Doug's thought, but neither can I claim any right to tell an author he can't write about someone who has it.

Dear Dr. Schmidt:

It seems to me that quite recently one of your boxes said something about how economics, though still in its infancy, could already rule out some of the fanciful societies that sf writers dream up.

In the February issue you print "Curlew's Choice," which implies (Gemma's pitiful tale, page 170) that every male has several women, whom he abuses physically and frequently replaces, killing those that he is tired of rather than passing them on to another male. So where do all these females come from? Alternatively, how do they dispose of all the excess males? If there is a deprived majority, why do they tolerate the sacrifice of perfectly screwable females? If they can control the sex of their offspring, why do they choose to produce valueless females instead of valuable sons?

A pathological society that was economically and psychologically realistic would be more complicated than the one shown in "Curlew's Choice"—and much nastier. I can predict, for example, that the women would romanticize sacrifice and (like the soldiers of some eras) worry only about dying well. When the outsiders invaded, they would ferociously defend their right to be animals just as contemporary women ferociously defend their right to wear pinching pumps instead of shoes and deeply resent being asked not to spend countless hours painting their faces.

JOY BEESON

Voorheesville, NY

The author replies . . .

Dear Ms. Beeson,

You have an excellent point and have pinned down a definite weakness in the story. It had been going round in my head for several years, but my main problem was fitting various pieces together. When I finally found the right framework, I was so pleased that it had gelled that I didn't think some of the background through.

I could plug the gap: either they kill off a lot of male children at birth (no great source of moral concern for such people) or they have an extensive source of female children in the ship's genebanks (standard equipment for colony-type ships). But that doesn't take care of your main point, that the society as it stands is very sketchily described and lacks credibility. I plead "guilty" and will try harder next time. In fact, your letter has given me some ideas towards a much better story: it may see print some day.

In any case, thanks for the feedback—it's appreciated.

IAN STEWART

Dear Stan:

Enjoyed your editorial in the February issue, partly because it asks questions that I have tried to answer in my novel, *Voyagers III: Star Brothers* (to be published by Tor in March). The *Voyagers* trilogy began as an examination of how the world would react to the unequivocal knowledge that there is intelligent life elsewhere in the universe. The trilogy has developed into an examination of how nanotechnology (and technology in general) moves the human race toward a new level of evolution.

BEN BOVA ■

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a calendar of analog

upcoming events

23-25 November

CONTEX 8 (Houston area SF conference) at Hilton Southwest, Houston, Texas. Guest of Honor—Robert E. Vardeman, Artist Guest of Honor—Sherlock, Fan Guest of Honor—Willie Siros. Info: Friends of Fandom, Box 266996, Houston TX 77207-6996. (713) 729-6733.

30 November-2 December

TROPICON 9 (southern Florida SF conference) at Fort Lauderdale Airport Hilton, Fort Lauderdale, Fla. Guest of Honor—Hal Clement, Fan Guest of Honor—Bruce Pelz. Registration—\$15 until 31 July. Info: SFSFS Secretary, Box 70143, Fort Lauderdale FL 33307.

7-9 December

SMOFCON 7 (SF convention-runners convention) at Fort Lauderdale Airport Hilton, Fort Lauderdale, Fla. Registration—\$40 until 30 September, \$45 until 15 November. Info: SFSFS Secretary, Box 70143, Fort Lauderdale FL 33307.

14-16 December

CONINE 2 (Oxford SF conference) at Oxford Polytechnic, Oxford, Oxon., U.K. Guest

of Honour—Ramsey Campbell. Registration £8 until 19 October 1990. Info: Conine 2, % Adrian Cox, St. John's College, Oxford OX1 3JP, U.K.

29 August-2 September 1991

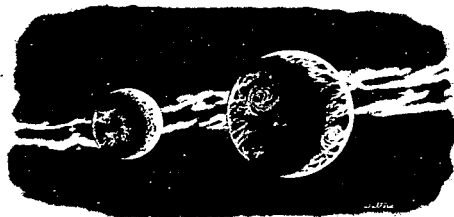
CHICON V (49th World Science Fiction Convention) at Hyatt Regency, Chicago, Ill. Guest of Honor—Hal Clement; Artist Guest of Honor—Richard Powers; Editor Guest of Honor—Martin H. Greenberg; Fan Guests of Honor—Jon & Joni Stopa. Registration—\$95 until 31 December 1990. Supporting—\$20 at all times. This is the SF universe's annual get-together. Professionals and readers from all over the world will be in attendance. Talks, panels, films, fancy dress competition—the works. Join now and get to nominate and vote for the Hugo Awards and the John W. Campbell Award for Best New Writer. Info: Chicon V, Box 8121, Columbus OH 43221-8121.

8-14 September 1991

VOLGA-CON (International SF convention on the Volga). Sponsored by SF Club "The Winds of Time" and the Youth Association ATOM. Info: Volga-con, % Boris A. Zagorodny, Volgograd—66, Poste restante, U.S.S.R. Telephones: 34-74-62, 34-74-64, 34-44-09, 34-86-56.

—Anthony Lewis

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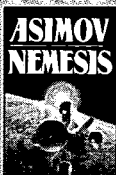
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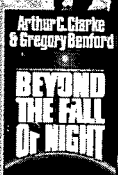
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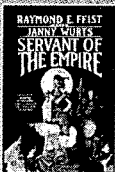
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